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THE TEMPLE OF ARTEMIS (DIANA) AT EPHESUS. RESTORATION OF THE HELLENISTIC (IV CENTURY B. C.) STRUCTURE AS IT APPEARED IN THE TIME OF ST. PAUL

IN THIS restoration I have pieced together the many fragments found of this famous temple. Indeed, it was considered the most magnificent in the ancient world, it being the only temple mentioned as one of the Seven Wonders.

The drawing has been compiled from the study of Wood's measurements, those taken by myself during the British Expedition and the fragments sent home by Wood and the latter expedition conducted by Mr. D. G. Hogarth. I can claim that the disposition of the parts shown could be placed upon the remains *in situ* without the removal of a single stone as measured by me in 1904-05. To give an idea of the size of the building, I might state that the breadth at the lowest step of the platform measures 239 ft. 4½ in. and that the width of the temple from center to center of columns was as follows: 20 ft. 1 in. × 20 ft. 1½ in. × 23 ft. 9½ in. × 28 ft. 1½ in. × 23 ft. 9½ in. × 20 ft. 1½ in. × 20 ft. 1 in.

This temple follows upon the lines of the previous one[1] excepting that it was raised upon a magnificent platform and was built in the prevailing style and was much more magnificent.

[1] See RECORDS OF THE PAST, vol. viii, 1909, pp. 194-206.

It was found during the excavations that the columns and walls of this temple were exactly superimposed above those remaining of the Archaic temple. I consider that this was purposely done as great weight had already been placed upon the foundations at these spots and they had proved to be satisfactory. Certainly we did find settlements to the Archaic temple but none to the foundations raised upon them. The 10 steps to the platform were placed upon massive stone piers in line with the columns. Many of these piers remain.

The arrangement of the western flight of steps was suggested to me by the method of arrangement at the temple of Apollo Didyme near Miletus. The groups of statues shown upon the podium represent conflicts between a Greek and a Persian to the left, and a Greek and an Amazon to the right.

The temple was famous for the grace and beauty of its columns. The height of these is given as calculated by Ferguson, namely 60 Greek feet = 60 ft. 9½ in. English. Thirty-six of these were adorned with glorious sculpture. Scopas is said to have been responsible for at least one. I have disposed of these 36 at the two end porticoes as in double ranks and between the antæ of the projecting end walls. The sculpture shown at the base of the columns follows the lines suggested by the late Doctor Murray as set up by him in the British Museum.

The architrave, bedmold, corona, and cymatium of the elaborate entablature are given as found, but no remains of dentals were discovered. As both the temple of Apollo near Miletus and the temple at Priene had this feature, I have introduced it in the form it takes at Miletus.

The angle of the pediment follows Murray but the sculpture in the tympanum is my own suggestion as representing the Asiatic Artemis, standing in a shrine mothering her devotees, some of whom are bringing, conducted by the Messenger, their offerings to her, while to the right and left are placed the sea and fertilizing streams.

On the apex of the pediment is placed another Asiatic form of Artemis, "The Goddess with the lions."

A bold scroll is placed as a frieze to the walls of the temple in the decoration of which bees are introduced to typify the priestesses in attendance who were called Bees, also a band of warriors is introduced as a dado decoration. Through the door is seen in front of the 127th column the well-known type of the Ephesian goddess as the cult statue.

For the purpose of showing the architecture all the innumerable offerings of statues and other objects which were deposited in and around this magnificent edifice have been omitted. I trust that the representation gives some idea of what a magnificient structure this temple must have been.

My thanks are due to Mr. Gilbert Bayes, the sculptor, for his beautiful rendering of the figure sculpture.

London, England. ARTHUR E. HENDERSON.

HEAD CARVED FROM PINK SOAPSTONE—NOT CATLINITE. NOTE RECTANGULAR EAR GUARDS AND UN-INDIAN FEATURES

DISCOVERIES INDICATING AN UNEXPLOITED CULTURE IN EASTERN NEBRASKA

WHAT seems to be a new culture is developing along the west bank of the Missouri River in Nebraska. Whatever its western boundary its eastern edge is the broad and "muddy" river, its southern limit may, for the present, be said to be the north shore of the Platte and its northern line has not as yet been determined. Scattered along the high bluffs which bound the western bottom lands of the Missouri are numerous saucer-shaped and sometimes slightly ovoid depressions in the earth which today are from a few inches to 9 ft. deep and from 25 to 125 ft. in diameter—the ruins of aboriginal dwellings. Some ethnologists regard them as of Mandan origin, others as Pawnee, and still others as Arikara, but although the culture seems to approach all of those it is only in that relationship which exists between primitive people and any attempt—as Mr. James Mooney expressed to the writer—to connect it with any living or historic tribe would be futile. According to the ethnologist quoted the culture seems to be that of an entirely extinct people like the so-called Mound Builders or Cliff Dwellers. Possibly it represents the ancestors of the races found in the vicinity by the first white explorers, but there is distinctive geological evidence that the culture is that of a people who lived hundreds of years ago. These ruins are the remains of permanent homes. Some seem to have been of

POTTERY HEADS
REDUCED ABOUT ONE HALF

construction similar to the Mandan earth houses described by early writers. In some earth was used as a covering while others were covered with bark or grass and osiers. In some ruins the explorer finds the roof to have been nominally 2 to 3 ft. in thickness; in others no evidence of a roof is visible, the floor of the dwelling being strewn with charred sticks, reeds or coarse grass. Many of the houses had been provided with a southern entrance and inclines 50 ft. long lead down to the deeper ruins.

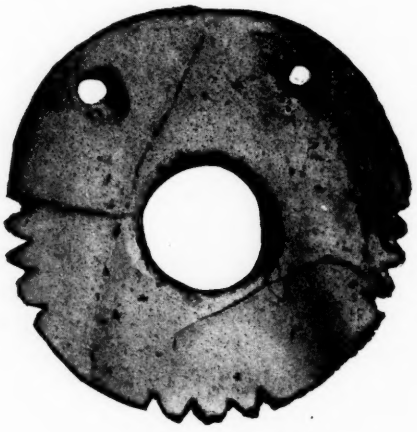
The writer has performed a vast labor in these old ruins in three counties in eastern Nebraska, and the results other than a determination of the method of their construction have been remarkable. Objects have

LARGE OLLA FROM A CACHE. NEAR THIS POT LAY A TERRA COTTA PHALUS
ONE-QUARTER ACTUAL SIZE

LARGE OLLA SHOWING DECORATED RIM
ABOUT ONE FIFTH ACTUAL SIZE

been discovered showing a decided southern—Mexican or Central American—influence, their range being probably greater than that of any other culture north of Mexico.

These ruins are in no sense in village groups, but are scattered at random, the principal object appearing to have been to secure the most prominent and lofty natural sites far above the river. Sometimes a dozen ruins will be found generally in a north-south line from 100 to 200 ft. apart. At other times there will be one central ruin of large size surrounded by four, a line connecting these will be found to form a square with the smaller ruins at equal distances apart, but often three smaller ruins will partly surround a larger one. Sometimes there are isolated ruins, no others being nearer than a mile or more. In eastern Douglas County there are possibly 200 ruins, in Sarpy County as many more, while in Washington County the number is estimated at 500.

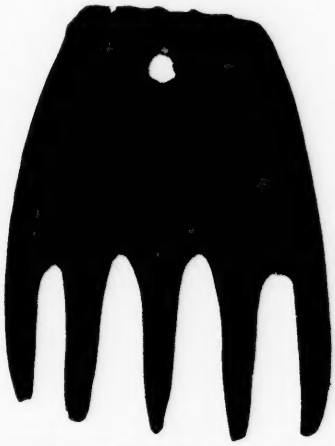


SHELL GORGET
ACTUAL SIZE

Ruins of a similar nature do not appear on the eastern or Iowa side of the river. There are many evidences, however, in western Iowa of a very ancient culture, easily distinguishable from that of the people of historic times.

Numerous tumuli are closely associated with these eastern Nebraska house ruins, but in only one instance has it been possible to secure skeletal material which can be related to the people who occupied these ancient sites.

In the ruins explored by the writer the floors are usually free of débris with the exception of evidence of a destroying fire. Experience has shown that the people were exceptionally orderly in their domestic habits and artifacts are seldom found scattered about. The major part of the objects in these ruins come from numerous caches placed in a circle from 8 to 10 ft. from the center of the ruin where the fireplace was located. These caches extend down below the floor from 3 to 6 ft. and are built in the shape



COMB—MATERIAL ELK ANTLER
ACTUAL SIZE

SHARD SHOWING DRAWING OF A WILD TURKEY

of an inverted funnel and usually are about the size of a hogshead. Objects were placed in the cache and covered with wood ashes from the fireplace, then earth was packed in and on this a small fire was kindled. Whenever a cache was so prepared the objects therein are in an excellent state of preservation and after long rains and heavy snows I have found them absolutely dry, not a sign that moisture had ever penetrated the walls being visible. As many as 16 caches have been found in one ruin, not all of them being used for storage of valued objects, however, many being filled with refuse consisting of broken shells, sherds, stones, burnt wood and ashes.

Among the objects taken from the caches may be mentioned the various scapula implements designated hoes or digging tools, and paddles, knives, scrapers and many unclassified articles made from the same bone.

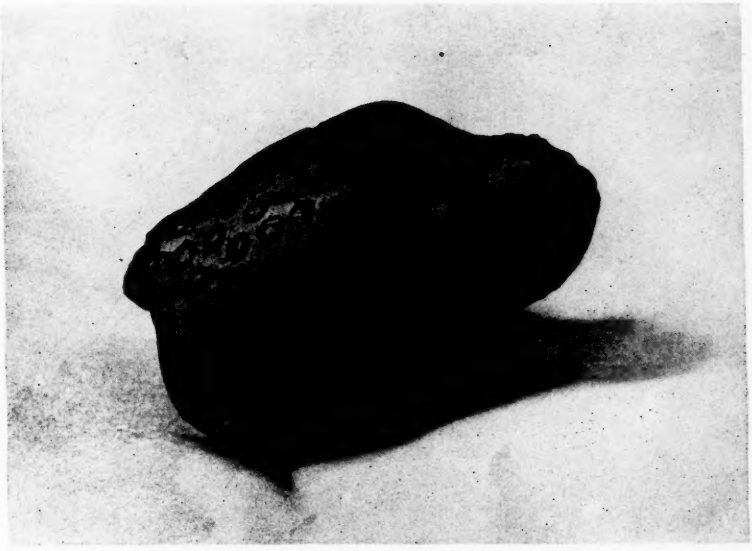
Pots and bowls of more than a dozen kinds including a reddish ware of unusual hardness show marks of a basket weave, others being cross-hatched with markings which could have been made with a grass-wound paddle. Other designs are incised lines, angular and wave, while one sherd is decorated with a good drawing of a turkey. Lugs or handles are adorned with mysterious modeled heads and faces, representations of a rising sun and turkey tracks. Much of the pottery shows the common finger-tip indentation on its edge, but some has been adorned with unique designs made with a pointed instrument. That the people were prolific potters is evidenced by the vast amount of sherds found in caches and refuse heaps which accompany the ruins. Some of the 14 pots in the writer's possession are reddish while others are brown, orange and black, the latter being unusually well made and slightly glazed. In size they range from vessels not larger than a thimble to ollas that would hold more than four gallons.

CARVED HUMAN HEAD OF PINK SOAPSTONE DRAWN TO SHOW THE DETAIL

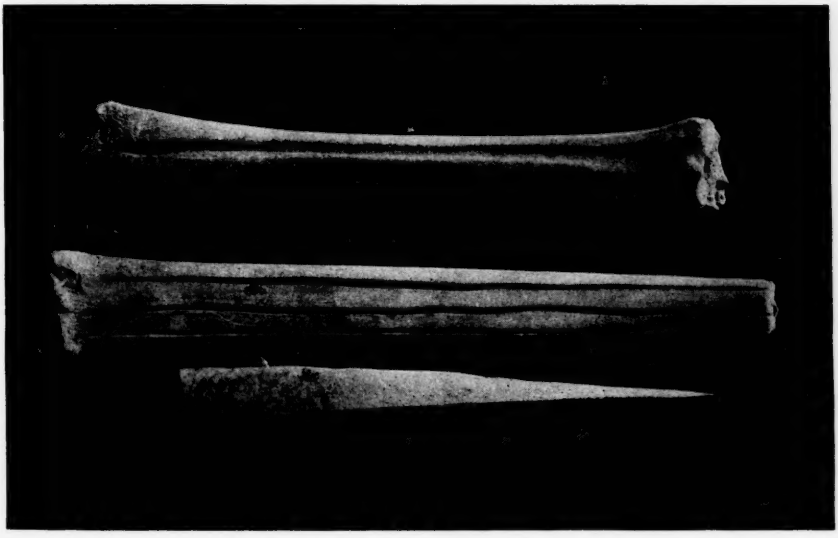
No grooved axes are found in these ruins. (Handsomely made grooved axes, sometimes with two grooves, are occasionally brought to light by the plow, but they seem to belong to another culture.) Celt axes are the only kind found in the ruins, ranging in size from 2 in. long by 1½ in. wide, to 9 in. long by 3 in. wide. Numerous small celts of chipped flint, rather roughly made, lie side by side with well made polished celts of diorite and greenstone. The smaller celts may have been fastened in a split handle like the flint swords of the Aztecs, frequently mentioned by Bernal Dias, evidence in the writer's possession supporting this assumption.

Pottery pipes of hitherto unknown designs are numerous, and neither McGuire's exhaustive work on pipes nor that of the Wisconsin Archeological Society contain similar patterns. The writer has them in the form of birds, beasts and reptiles. One is adorned with conventionally drawn serpents. Fine pipes of a rich dark purple soapstone were also made, some are plain while others are engraved with circles and wave lines.

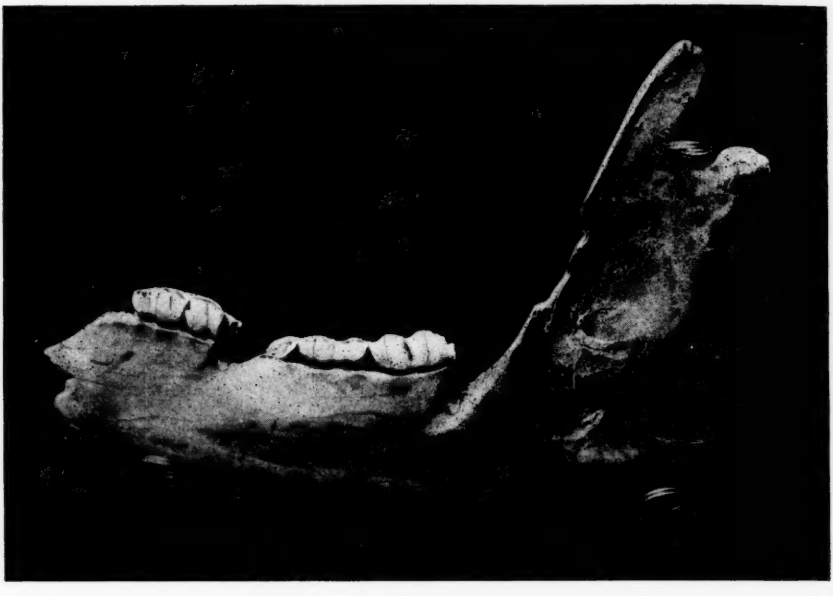
Shell spoons, a short handle cut in one end the opposite end showing an edge beveled at right angles to the grain of the shell are numerous; commoner spoons are without a handle. Shell pendants in form of fish, skillfully made and porportioned and shell bangles perforated for suspen-



POTTERY PIPE REPRESENTING A FROG
ONE-THIRD ACTUAL SIZE



THREE STAGES OF NEEDLE MAKING—LEG BONE OF DEER. THE SAME BONE SHOWING METHOD OF CUTTING OUT NEEDLES. FINISHED NEEDLE



RIGHT MANDIBLE OF MULE DEER SHOWING DEEP GROOVES THROUGH TEETH AND INTO THE BONE. USE UNKNOWN

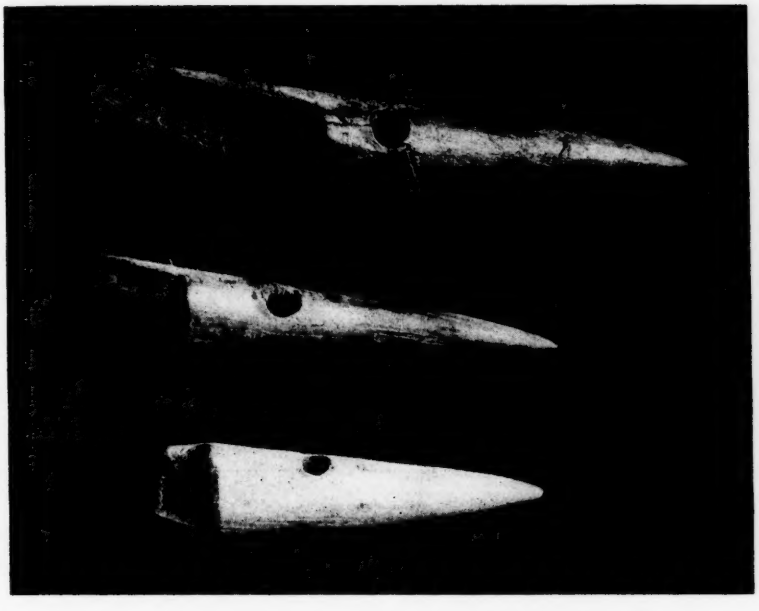
sion are found. A shell gorget of unusual design is one of the recent discoveries. Various other objects of shell are of unknown use.

Four singular beads of clay were found closely associated with the charred strands of a plaited hair rope. These beads are a little smaller than a black walnut. One is ovoid while the others are round. The holes through the beads were not drilled but formed when the clay was soft. These beads appear to have a glazed surface or a very high polish. The writer has yet to learn of similar beads being found elsewhere.

Arrows and four-edged stone knives are made of native flints and Wyoming jaspers. The former are of several patterns and are far better made than arrows turned out by the plow.

Shallow metates are made of drift rocks and sandstone. Discoidal stones and stone club heads, the latter ground so two crossing ridges are formed, and rounded and flattened crushing stones or pestles are among the stone objects. Arrowshaft smoothers of fine workmanship are made from a dark orange Dakota sandstone and a kind of pummice. A bead an inch long and a half inch thick, rounded, polished and drilled from each end is made of milky quartz. Pitted stones, possibly used for cracking nuts and pounding corn are common. A diamond-shaped flint knife socketed in the hollowed end of an antler handle and a hafted scraper are novelties, the scraper haft is also made of antler. Triangular and rectangular pendants of white soapstone are occasionally found.

By far the most interesting objects are those made of bone and antler. A straight bone, 5 inches in length and of the thickness of a lead pencil (the



SHUTTLES FORMED FROM ANTLER TIPS

bone not identified as yet) its sides showing scores of slight notches, its ends beveled not at all unlike a modern steel drill, is probably the only true flint flaker found in these ruins. The antler objects accredited "flint flakers" show no wear such as would result from work of that nature. The writer has a dozen of the latter and has finally decided they were probably used as phalli, terra cotta phalli having been found in one ruin, indicating their use by these people. Various forms of fine bone needles or punches are numerous and a well made series of flat and thin bone bodkins or needles with an eye are a part of the objects found. Shuttles not at all unlike the shuttle of the old-fashioned Singer sewing machine are among the rarer finds. They are formed from the tips of antlers. Fish hooks have notches on the outer curve of the elbow and a fish hook partly made, the latter discrediting the theory that bone fish hooks developed from the bone buckle, so featured in a recent work on the stone age have been found. Three stages of needle making—the leg bone of a deer, the same bone deeply incised its entire length 3 or 4 times and complete needles made from similar bones—have been twice found. So-called arrowshaft straighteners with one, two and three beveled holes are persistent features in the caches. One of these has a conventional snake engraved upon it. Bone celts of great fineness, some with a cutting edge, and bone "handles" have an extremely high polish. The most singular objects of bone found in the ruins are the right mandible of mule deer. On its inner side are two deep grooves an inch and a half apart, worn down through the teeth and deep into the bone as by a cord, the groove being very highly polished. There is no groove

BONE FISHHOOKS. NOTCHES ON THE OUTER CURVE OF ELBOW. PARTLY MADE BONE FISHHOOK IN CENTER
ACTUAL SIZE

in the outer side of the mandible, which is also polished very highly. No one seems to be able to determine the uses of this implement, 8 of which have been found. A hoe formed from part of the skull of a bison is probably the only one of this kind ever found. Skulls of wild dogs and wolves and sometimes pieces of human skulls are found in the caches. Anklets and bracelets, from 1 to 2 in. wide, are formed from the base of antlers of large deer or elk. The antler is cut so that the bracelet takes its form from the rounded portion of the antler, that is, the rounded antler gives form to the bracelet and therefore does not need to be fashioned or bent as would be the case were strips cut lengthwise from the antler. Tortoise shells are also frequent.

These are some of the objects found in the ruins of eastern Nebraska. What people they belonged to may never be known, but that they were sedentary and had no enemies is evidenced by the isolation of some of their homes. That they relied for sustenance partly upon agriculture is shown by charred corn and cobs found in their ruins.

One result of an archæological reconnoissance on the Omaha reservation, Thurston County, Nebraska, the last week in September this year, showed how the Omahas regarded ruins similar to those in the three counties in which my labors have been pursued. I found the familiar ancient type of ruin at several points on the reserve and learned from Dr. Susan Picotte and her sister, Mrs. W. T. Diddock of Walthill, Nebraska, both of whom are sisters of Mr. Francis LaFlesche of the Bureau of Ethnology, as well as other Omahas living near the village of Macey, the agency point, that the Omahas never knew exactly what the ruins were, regarding them as the work of a people of whom they knew nothing. When the party to which I was attached, composed of Mr. W. T. Diddock, a prominent real estate dealer of Walthill, and Prof. M. R. Gilmore, curator and archæologist of the Nebraska Historical Society, excavated a portion of one ruin situated 50 yards from the fine farm home of Noah LaFlesche, a relative by marriage of Mr. Francis LaFlesche—we found a "cache" filled with wood ashes, flints and sherds. The Omahas who were drawn by curiosity to the spot, were much astonished and declared that they had never heard their tribe were pottery makers and they appeared at a loss to account for the ancient ruins.

The writer also noticed on the reservation associated with the ruins equally ancient tumuli, but limited time prevented exploration. The writer believes the exploration by his party to be the first comprehensive archæological labor performed in the old ruins on the Omaha reserve.

Surface work in a cornfield owned by Mr. Noah LaFlesche was productive of chert implements, potsherds and one sandstone "bone-pointer," similar in material and design to those from ruins nearer the Platte River.

The writer has placed his collections from these ruins in the Omaha Public Library museum where they can be conveniently studied by scientist and layman.

ROBERT F. GILDER.

Omaha, Nebraska.

POTTERY PIPE IN FORM OF BIRD WHOSE BILL IS ARMED WITH TEETH

THE KENSINGTON RUNE STONE ABROAD

ON MAY 8, 1911, the Museum Committee of the Minnesota Historical Society rendered another unanimous report on the Kensington Rune Stone.[1] It reiterated its earlier conclusion favoring the genuineness of the inscription,[2] and recommended that Professor N. H. Winchell and Mr. H. R. Holand be sent abroad with the stone at the expense of the Society for further study. This recommendation was not adopted by the Society for various reasons, chief of which was its confidence in its committee's thorough investigation, making, in the Society's opinion, a journey abroad an unnecessary expense.

I could not subscribe to the Society's conclusion that the proposed trip was an unnecessary expense. There were especially three reasons which prompted the journey. They were as follows:

To institute a search for the supposed rune stone found by La Verendrye in the Dakota region in 1738 and by him sent to Paris.

To learn on what grounds the Scandinavian scholars had condemned the Kensington Rune Stone. These reasons we had vainly sought to obtain by mail.

To learn in what relation the Kensington Rune Stone stands to the Dalecarlian (Sweden) inscriptions of the XVII century. Professor G. T. Flom claims that the Minnesota inscription "is the work of one who was familiar with the Dalecarlian runes and dialects" and is therefore a recent forgery.[3] The Minnesota Historical Society's committee was so much impressed by Professor Flom's supposed identification that it added to its report the following: "The genuineness of the Kensington Rune Stone must be determined, if Professor Flom's identifications be accepted, by an investigation directed to the question whether the Dalecarlian system of runes existed at the date 1362."[4]

As I just at this time received an invitation to be the guest of the city of Rouen, France, during its great millennial celebration and to present the subject of the American rune stone to the historical congress assembled there, I therefore left for Europe with the stone on May 30. I shall divide the results of my foreign researches into three chapters according to their purposes.

THE LA VERENDRYE STONE

In 1738 the Chevalier de la Verendrye made a trip from Montreal to the seat of the Mandan Indians (near the present Bismark, N. D.). Near their territory he found a small stone curiously engraved on both sides with

[1] For introductory information on this subject see RECORDS OF THE PAST, Vol. IX, pp. 3–7, 240–245 and Vol. X, pp. 33–40.

[2] See *The Kensington Rune Stone, Report to the Minnesota Historical Society*, December, 1910, St. Paul, Minn.

[3] See *The Kensington Rune Stone*, An Address by George T. Flom, Springfield, Ill., 1910, p. 26.

[4] *The Kensington Rune Stone, Report to the Minnesota Historical Society*, f. 57.

strange characters. He satisfied himself that the inscription was not of Indian origin and then took it with him to the Jesuit scholars at Quebec. These were agreed that the inscription contained letters (Indians use only pictographs) and that these letters were Tartarian in origin. It was then sent to the Minister of the Marine, G. de Mauripas.[5]

Tartarian and runic characters have a remarkable similarity and would look alike to one who was not a specialist in either. As the Tartarian origin is out of the question and as the inscription was of neither Indian nor any known European origin, the conclusion is more than probable that this was a *runic* inscription. This belief gains emphasis when we remember that this stone was found near the home of the Mandan Indians who showed unmistakable signs of being the offspring of a mixture with a blonde white race.[6]

About a year ago the Minnesota Historical Society appealed, through Governor Eberhardt, to the French authorities to find this stone. But these authorities merely shrugged their expressive shoulders and murmured something about "American humbug." But there is no humbug possible in this case and we cannot afford to lose our earliest historical records because of this supercilious indifference. On my way to Europe I therefore stopped in Washington and with the energetic support of Senator Knute Nelson succeeded in getting our Secretary of State, Mr. John Knox, and the French Ambassador, M. Jusserand, to make official requests to the French to make search for the stone.

In Paris I personally searched the museums of the city for the stone but in vain. As none of these museums existed at the time the stone was sent to France it is probable that the stone is still reposing in some private collection, if yet in existence. The most feasible route to find any trace of it seems to be to search the archives and private papers of M. de Mauripas, Minister of the Marine to whom the stone was sent. This work has been kindly undertaken by Mr. Waldo Gifford Leland who now for 4 years with 4 assistants has searched the French archives for material on our colonial history under the auspices of the Carnegie Institution.

Finally, I brought the subject to the attention of many eminent French archæologists and historians at my address on the subject in Rouen, and it is now probable that we will soon hear something more about this strange runic stone of La Verendrye.

FOREIGN OPINIONS ON THE KENSINGTON STONE

I found that the runologists and Scandinavian philologists of Europe had only a very slight knowledge of the Kensington Rune Stone. They had, to be sure, all received copies of the elaborate and scholarly report of the Minnesota Historical Society, but I found only one man, Professor

[5] For a detailed account of this stone see Kalm's *Travels into North America*, London, 1771, Vol. 3, pp. 125–128.

[6] For a full discussion of this interesting tribe see *The Mandans, A study of their culture, archæology and language*, by Will and Spinden, Cambridge, Mass., 1906, particularly pp. 99–104.

H. Koht of Christiania, who had taken the trouble to read it.[7] They had all obtained some earlier fragmentary notions of the subject from Professor G. T. Flom's pamphlet in which he endeavors to disprove the inscription. This pamphlet had been scattered broadcast among the scholars of the Scandinavian countries and its impressions had been supplemented by Professor Flom's personal canvass among them last summer for the purpose of proving the inscription a forgery. There was, therefore, a general feeling of distrust toward the American rune stone.

When analyzed these reasons were, however, found to be most trivial. They consisted chiefly in unfounded suspicions against Ohman and Fogelblad, two men who were implicated in the finding of the stone, and in superficial assumptions that the inscription contained a number of English words. Those who have followed this investigation know that Ohman and Fogelblad were exonerated by the Minnesota Historical Society more than a year ago, and the misapprehension concerning the supposed English words was dispelled by an article published in RECORDS OF THE PAST a year ago.[8]

To guard against a wrong impression being given of these men's scholarship, I must hasten to say that not all found English words in the inscription. It was a common delusion entertained by many men of ability but little experience in this particular line of study. The better informed specialists laughed at the idea and were kind enough to point our correlative uses of these words in obscure texts which illustrated the eminent propriety of these words in the American inscription. For instance, Professor Södervall, the eminent Swedish lexicographer, pointed out where *from*, which in the earlier stages of this investigation was one of the most disputed words, occurs (with the spelling *fram*) a number of times in Lydikinus, an obscure legal annotator who lived in Westgothland, Sweden, about 1300.[9] *Fram* and *from* are of course the same words, the one merely representing a little earlier sound value than the other. Professor Axel Kock has shown that this sound change from *a* to *o* occurred in the first half of the XIV century.[10] Similarly, Professor Finnur Jonssön, the greatest authority on Old Norse in the Scandinavian countries, pointed out a number of passages where *mans* (another disputed word) occurs as a collective genitive as upon the stone and as was amply illustrated in RECORDS OF THE PAST, Vol. X, p. 244. He also pointed out an interesting passage in *Ynglingatal* where the particle *of* occurs in connection with an adverb of direction as upon the stone.[11] On the stone we have *of west* which was considered an impossible

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[7] Professor Koht is professor in history and is one of the leading investigators in Norway. He recently made an extensive trip through America and thus overcame the supercilious disdain which is a common European attitude toward American scholarship. After my address in Christiania he told me in private conversation that if the Kensington stone was *in situ* in 1890 it was in all probability genuine. The significance of this date (1890) lies in the fact that in that year (or 1889) appeared Professor Storm's *Studier over Vinlandsreiserne*, where the fact is brought out for the first time that in the very year of the inscription there was a Norse expedition in American waters.

[8] See the article *Are there English words on the Kensington Runestone?* RECORDS OF THE PAST, Vol. IX, pp. 240–245.

[9] See *Vestgötalagen*, Schlyter's edition, Stockholm, 1827, p. 397, art. *fram*. See also *Birgittes Uppenbarelse*, Klemmings edition, Stockholm, 1857, Vol. I, p. 101, line 5. Cf. p. 404 also p. 363, l. 13, cf. p. 407. See also Noreen's *Altschwedische Gram.*, p. 189, par. 248.

[10] See Kock's *Svensk Ljudhistorie*, Vol. I, pp. 352, 353.

[11] See Heimskringla, Jonssön's edition, Vol. I, p. 51, line 9. See also p. 34, line 11.

anglicism: in *Ynglingatal* we have *of austr* (east)—in both cases the meaning being "extensively west (east)ward."[12]

At my address on the rune stone before the historical congress in Rouen, Professor Oscar Montelius, the royal antiquarian of Sweden, discussed the inscription and advanced three arguments which he thought militated against the authenticity of the inscriptions. They were as follows:

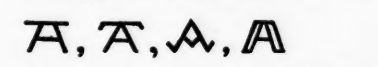
1. The particular form of the Roman *a*— —which occurs in one place in the inscription was not known in any of the Scandinavian countries in the middle ages.

2. The particular runic form of the same letter— —does not occur in any other runic inscription and seems to be an invention of the scribe.

3. The system of numerals used in the inscription is not found on any other rune stone, or anywhere else, and is an ingenious invention of the scribe.

In answer to these objections I will submit the following:

1. The Roman alphabet was in general use in the Scandinavian countries during the middle ages and it is therefore reasonable to suppose that the plain unadorned Roman *A* was also known. In Hildebrand's reproduction of XIV century seals[13] we therefore also find the Roman *A* several hundred times. As is befitting a seal the letters are, however, more or less ornamented and the *A* appears most often like this:



Yet these are not a difference of type but of embellishment. If one, however, insists on finding the letter without ornamentation it can be seen in a number of documents, seals and inscriptions from the XII and XIII centuries.[14] Our runemaster writing upon stone and under tragic denouements did not find the circumstances favorable to fanciful embellishments.

2. The runic (a). It is impossible to say, aside from this inscription, what was the correct form for "a" in 1362 as no other inscription is preserved from that part of Sweden from that century. There seems, however, no reason for supposing that this character is an invention of the scribe: if he were a modern forger and was in doubt concerning the form he could always with perfect safety fall back on the older well-known forms shown on other stones and in books. A new form, on the contrary, would not only be unnecessary, but dangerous, as he could not know how soon another inscription from that time would be found in which event his self-made form would convict him of forgery.

3. The numerals. It is true that these numerals do not occur on any other rune stone, but we cannot give the credit of inventing this ingen-

[12] I desire to point out that the statements attributed to the gentlemen mentioned above are not to be understood as being any defense by these men of the genuineness of the inscription as a whole. They wished to take no position either for or against the inscription, not yet having studied it, and their opinions cited have only bearing upon the words discussed.

[13] Hildebrand, *Svenska Sigiller*, Stockholm, 1862.

[14] See *Paleografisk Atlas, Dansk Afdeling*, Copenhagen, 1903, Pl. II; Peringskjolds *Monumenta Uplendica*, Stockholm, 1710, pp. 166, 171; *Svenska Skriftprof*, Stockholm, 1894, Pl. I; and Pl. VI; and Överlands *Norges Historie*, Vol. III, pp. 525, 530, Pl. B (opposite p. 646), 756, 785, 890, 522.

ious system to the Kensington scribe. During the middle ages there was in use a system of perennial calendars known as *primstave*. They consisted of a flat stick of wood about 3 ft. long and about 2 in. wide. On this was carved a multitude of signs to represent the many holy days of the church and separated by a number of dots to represent the intervening days. Besides this the most ancient of the *primstave* also contained 19 numerals, one for each of the moon-cycle's 19 years, and by help of which one could figure out the different days upon which the new moon of that year would appear. An ancient writer by the name of Ole Worm, living about 300 years ago, interested himself in collecting these old *primstave* of which then only a few were found. In a Latin work published in 1643[15] he has pictured the different numerals which he found on these *primstave* and there we also find the same system as is used on the Kensington stone. Professor Sophus Bugge has shown that these numerals were in use in the XIV century or synchronical with the date on the stone.

Ole Worm's book is the only literary or archæological source where any student of today could have borrowed this system of numerals. The important question, therefore, remains: Did our scribe borrow them from Ole Worm? If he did, the inscription is a modern forgery. If he did not, it must be genuine. A comparison will suffice to show that the runic scribe followed another model than Ole Worm. The following is a copy of the numerals on page 69 of his book:

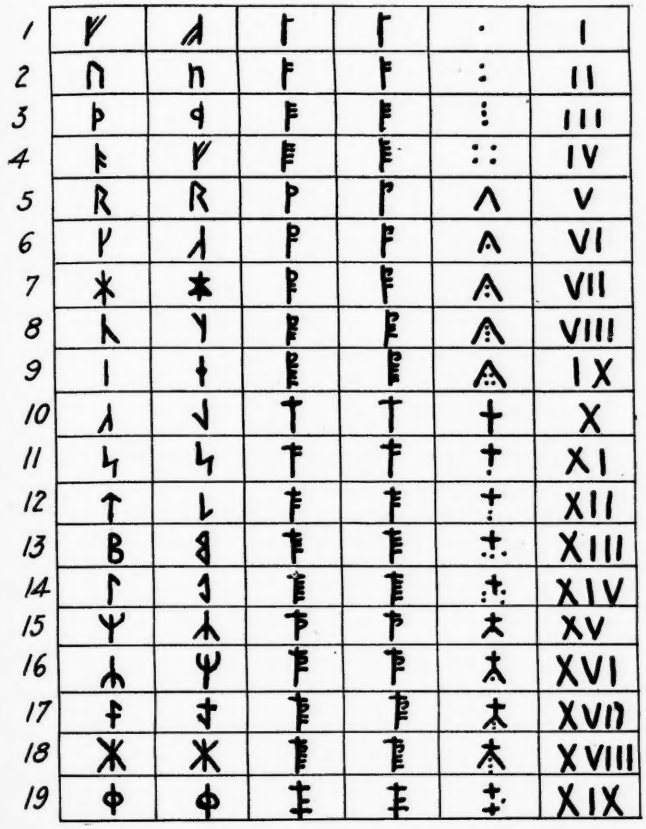
As will be seen, the third and fourth columns are one in system with the numerals on the rune stone. But while the upper transverse line in columns 3 and 4 begins below the top of the vertical line or staff it begins at the extreme top in the rune stone's numerals. A still more significant departure we find when we reach the numeral for 10 and beyond. In columns 3 and 4, 10 is represented by a simple cross † a figure much easier to cut in stone than the circle which caps the staff to designate the number upon the rune stone. Finally, the character for 14 is different.

It is plain that our runemaster has followed another model than those of Ole Worm. The presence of these numerals is, therefore, not an argument against the stone, but an incontrovertible proof of the genuineness of the inscription.[17]

During my extended visits to the different seats of learning in the Scandinavian countries I met only one philologist who would go on record as being convinced that the inscription was a forgery. This was Marius Hægstad, a teacher of the *Landsmaal* or combined folk-dialect of Norway in the University of Christiania. He is an old, outspoken opponent of the inscription, but although he has had the opportunity of studying the subject for several years, his objections are so elementary and so deficient in knowledge of the Swedish literature of the XIV century that it belittles the discussion to consider them seriously. However, he has stated his objections so emphatically that he has attracted considerable notice and

[15] Ole Worm, *Fasti Danici*, 1643, p. 69 (latter part of volume).

[17] It should be added that Professor Montelius subsequently gracefully withdrew the bulk of his objections and admitted that evidence had not yet been presented that proved the inscription a forgery. He publicly acknowledged that it merited the most thorough investigation and personally proposed to study it.



I will therefore reply to them in detail. The following assertions were made by him:

1. "Swedish endings are uniformly *a* and *ar* but in the inscription we find the very first word ending in *er—göter*.

2. "The preposition *paa* or *po* does not occur until 1470. Up to that time the form was *a* or *aa*. The inscription cannot, therefore, be older than 1470.

3. "*Opdagelse* does not occur until 1700. The inscription cannot, therefore be older.

4. "Singular verbs with plural subjects have not even up to the present day been introduced in Swedish. In Norwegian this usage first came into existence by the royal mandate of 1865. The inscription cannot therefore, be older than 1865.

5. "The inscription reads *fro thenno öh*. In 1362 the feminine gender would demand the reading *fro thessari öy*.

6. "The syntax is impossible in that *äptir* is used as a conjunction in the clause *äptir wi kom hem*.

[18] It is my opinion that this numeral is to be read 41; see *Journal of American History*, Vol. IV, p. 172, note 8.

7. "The sentence *wi war ok fiske*, which must mean 'wi war *at* fiske,' shows that the inscription was written after the conjunction *ok* and the mark of the infinitive *at* became confused by the common pronunciation *aa*. But this did not take place until quite recently." The above affirmations were made by Professor Hægstad without any supporting citation or other proof. We will now see if they are so self-evident that they will "stand without hitching."

1. In the dialect of Westgothland, which is the speech in which the inscription is written, there is no uniformity of endings in *a* or *ar*. Collin and Schlyter in their learned introduction to the Westgothland Law (written about 1300) call especial attention to the fact that endings in *er* are very common. To illustrate, they mention the occurrence of such words as *saker*, *kaller*, *taker*, *häreth*, *vegh*, *mather*, *stande*, *uten*, etc., in all of which words we would regularly expect *a* in the last syllable.[18]

In *Gamle Eriks Krönikon*, also supposed to be a product of Westgothland, written 1320 and *Karls Krönikon*, written in 1452 we find abundant endings in *e* and *er*. *Resa* and *reisan* alternate with *rese* and reisen.[19] This shows that the unaccented vowel in the last syllable was of such uncertain sound that it was sometimes written with *a*, sometimes with *e*.

2. The preposition *paa* or *po* occurs much earlier than 1470. *Gamle Eriks Krönikon* written 1320 says, "een draghe laa *paa* meget gul."[20] A letter of 1323 says, "*paa* nogars sida."[21] Another of 1345 says, "*paa* begge arwinghe sidhe."[22]

3. *Opdagelse*. Even if this word were not found at all in the dictionary of the speech of the middle ages, this would be no proof that it was not in use. Literature is not a product of the dictionary but vice versa. As this word represents an uncommon idea (*discovery*) its occurrence in the meagre literature of that time is therefore very infrequent. We find it, however, at least 150 years before 1700, the date set by Hægstad for its earliest occurrence.[23] It is impossible to say how much older it is. It is presumably a loan from the Dutch, where we find it much earlier than 1362. It is reasonable to assume that the runemaster was a mariner, and in that case would be among the first to pick up foreign words.

4. When Professor Hægstad says that the use of singular verbs with plural subjects was first introduced by royal mandate of 1865, it is safe to reply that popular speech takes no cognizance of royal mandates. Linguistic forms are not created in that way. There is a literary style of the scribe and the dialectic form of a district and there may be centuries between the fusion of the two.

The fact that the *literary* form in 1362 was *wi hafdhum* and *wi warum* does not therefore mean that the *dialectic* usage necessarily was the same.

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[18] See *Vestgötalagen*, Collin and Schlyter's edition, 1827. Introduction, pp. iv, v, xi.

[19] See *Medeltidans Rimkrönikor*, Klemming's edition, Stockholm, 1856, ll. 2024, 2996–7, 3286, 3315, 4533, 6271, 9448, etc. See also letter no. 3948a from 1345 in *Diplom. Svecanum*, Hildebrand's edition, where we read "paa begge arwinghe sidhe."

[20] Molbech's *Ordbog*, p. xlv.

[21] *Diplom. Svecanum*, Hildebrand's edition, no. 2419.

[22] *Ibid.*, no. 3948a.

[23] See Kalkar's *Ordbog*, Copenhagen, Articles *opdage* and *optække*.

Dialectic divergences were just as possible then as now. Although we lack examples from the dialects of that time, it can be proven from the literary language itself that the phonetic usage of the time was *wi hade* (as occurs on the stone) instead of *wi hafdhum*.

This is demonstrated by the following: The common literary forms of that day were, as stated, "wi hafdhum" or "the haffdo." These are the forms which, for instance, the author of *Gamle Eriks Krönikon* (ca. 1320) and other writers of the time seek to use because they are the accepted literary forms of their time. But every now and then we find them using the singular verbs "wi hade" or "the hade." (I have noted about 30 instances but there are many more. The same is true of the letters of that time.[24]) Why does this latter form occur? The reason is that every little while they forget their literary forms and revert to their dialectic. If the dialectic forms were the same as the literary, then of course there would be no explanation for a second form. But this dual usage shows that the one was the literary, the other the dialect form.

Professor Verner Dahlerup has shown in his history of the Danish language that the plural verb forms had been largely superseded by the singular in many parts of the north in 1350.[25]

5. *Thessari* as a feminine pronoun occurs so rarely in the Swedish literature of the XIV century that its sporadic use must be considered as an archaism. In a dissertation of 4 pages in his Swedish dictionary Professor Södervall states that the form of this pronoun is exceedingly variable, but that *thenne* is the most common form even with feminine nouns. This is because the feminine gender was about this time largely superseded by the common.

6. I have not personally investigated how early *äptir* occurs as a conjunction in the Scandinavian tongues. Professor Andrew Fossum has, however, cited numerous instances from the literature of that time, both Danish and Swedish, in which *äptir* occurs as a conjunction.[26] Professor Hægstad is, therefore, in error in this as in all other points he has touched.

7. Professor Hægstad's objection on this point is due to a misunderstanding. "Wi war ok fiske" is not an infinitive but a preterite. It is a dialectic construction of "wi warum (ute) ok fiska (dum)." *Ok* in this sentence is, therefore, a regular conjunction in regular form. This discussion has, therefore, nothing to do with the question when the mark of the infinitive *at* became confused with the conjunction *ok* by common pronunciation.

There is in Europe a number of educators who tied down to their narrow little round of duties have been led to believe, through an unfortunate superstition, that all things American are tinged with humbug. In their puritanical zeal against imaginary errors they *a priori* condemned the Amer-

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[24] See *Medeltidans Rimkrönikor*, Klemmings edition, II. 1514, 2087, 2581, 3414–16; see also letter of 1349 in *Svenskt Diplom.* no. 4503; also *Brandts Læsebog*, pp. 122, I. 16 and 123, I. 10 containing illustrations of *wi hade* from *Mandevilles Reiser*, written about 1400.

[25] *Det Danske Sprogs Historie*, Copenhagen, 1904, p. 33.

[26] See for instance, "æffter han havär fyrst hiemme wärät" quoted from *Riberetten* (XIV century) with numerous other examples by Professor Fossum in the *Norwegian-American*, Northfield, Minn., Feb. 24, 1911.

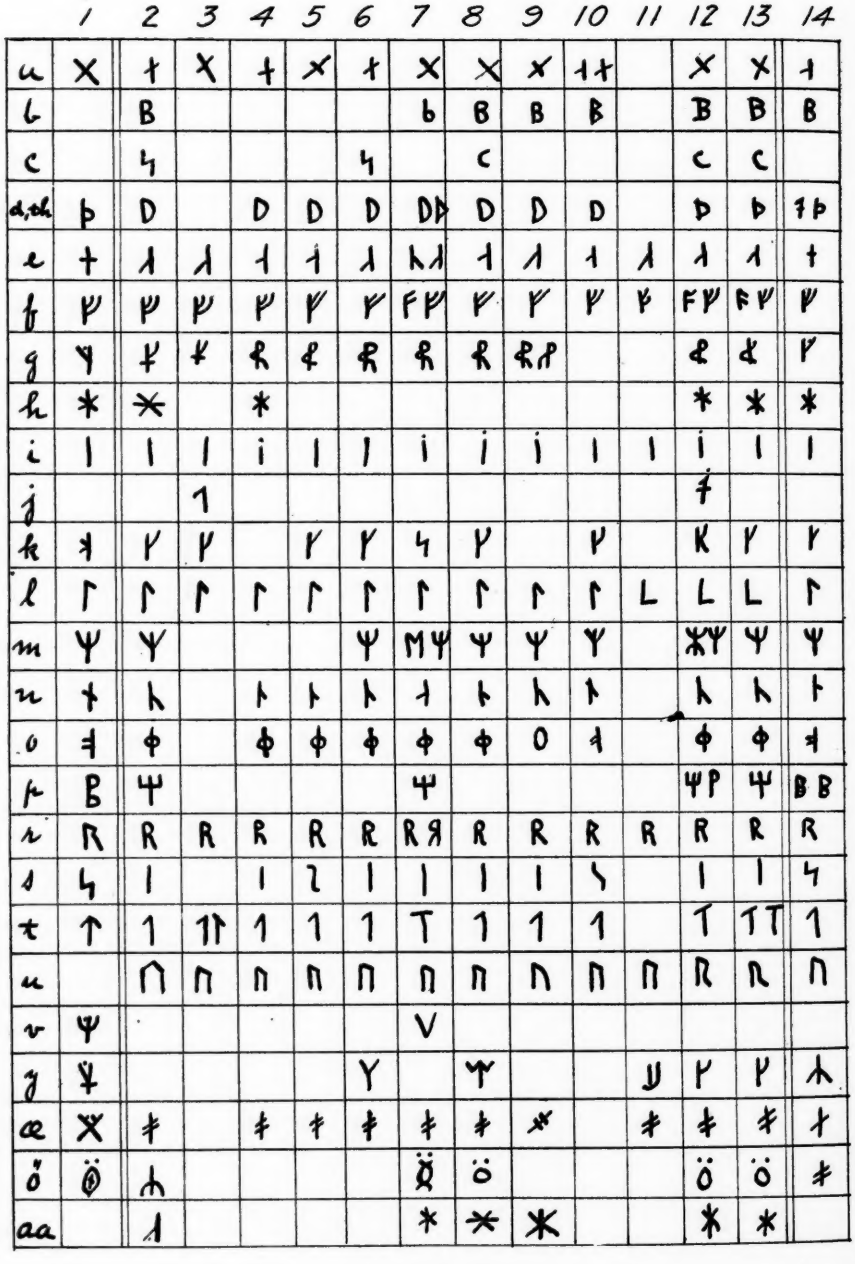


TABLE OF DALECARLIAN RUNIC ALPHABETS

FOR KEY SEE BOTTOM OF PAGE 269

ican rune stone as a humbug and have, like Professor Hægstad, done their best to sustain their opinion. But the reader will agree that it is but a sorry best as not a single objection is valid.

THE DALECARLIAN THEORY

In an extremely partisan attack on the genuineness of the Kensington rune stone, Professor G. T. Flom[27] waxes almost jubilant over his imaginary identification of the runes and language of the stone with those of the district of Dalarne. He is so cocksure of this comparison that he is even able to state which village in Sweden the supposed forger comes from.[28] This surprising conclusion shows that Professor Flom unfortunately can have no acquaintance with the Dalecarlian runes or linguistic forms. While there of course is some similarity between the various runes and dialectic forms of the different districts of one small nation, nothing could be further as a base of comparison than the Dalecarlian. To make this perfectly clear I have grouped together the alphabets of all the leading Dalecarlian inscriptions so that they can be readily compared with the alphabet of the Kensington stone, which is placed in the first column:

Columns 2–11 are individual Dalecarlian inscriptions while columns 12 and 13 show the Dalecarlian alphabets as arranged by Ihre, Götlin and Liljegren. Column 14 shows the alphabet of the Scanian Law which dates from about 1275.

A brief comparison of these alphabets will show that the Kensington runes have nothing to do with the Dalecarlian. Of the 20 characters found on the American rune stone no less than 13 (*i. e.*, the runes for *a*, *e*, *g*, *k*, *n*, *o*, *p*, *s*, *t*, *v*, *y*, *ä* and *ö*) are different from any and all of the Dalecarlian alphabets, while a fourteenth (the rune for *d*) is different from all but one inscription. These Dalecarlian inscriptions belong in a district which lies about 300 miles north of Westgothland, the home of the author of the Kensington inscription, and is separated from the same by vast forests and a lapse of 300 years. It is therefore not strange that there should be such great divergence. About 200 miles south of Westgothland lies the district of Scandia, where was written the Scanian Law almost 200 years earlier than the Kensington inscription. The alphabet of this is given in column 14. A comparison with this will show that the American runes differ from this in only 7 particulars (the runes for *a*, *k*, *n*, *t*, *y*, *ä* and *ö*) which is commensurate with its nearer approach in time and distance.

When we compare the linguistic forms of Dalarne with those of the Kensington inscription, Professor Flom's theory proves equally untenable.

[27] See note 3.
[28] *Ibid.*, p. 30.

1. The Kensington stone, 1362
2. Bureus, 1599
3. Dragga-Röset, *ca.* 1600
4. The chair of Lillherdal, *ca.* 1600
5. The Orsabeck loft, *ca.* 1635
6. Præstlogens bod, 1706
7. Præstboden i Elfdalen
8. Aasen boden, 1729
9. Baltzar, 1750
10. Runestaff of XVII century
11. A plane from Lillherdal, 1759
12. Ihre-Götlin, 1773
13. Liljegren, 1832
14. The Scanian Law, *ca.* 1275

The most prominent difference is that while our inscription abounds in aspirates such as *hem*, *har*, *hade*, *dagh*, *havet*, *öh*, *ahr*, etc., the *h* is totally lacking in the Dalecarlian speech.[29] Besides that the word forms are different throughout. If the inscription were in Dalecarlian dialect we would have *ema* for *hem*, *ör* for *ahr*, *ela* for *illy*, *sen* for *havet*, *menn* for *man*, *bluäd* for *blod*, *kumo* for *kom*, *ver* for *vi*, *sker* for *skjar*, *sjaa* for *se*, *vesto* for *vest*, *nordo* for *norr*, *resa* for *rise*, *voro* for *var*, *duä* for *ded* and *esu* for *deno*.[30] No Swedish dialect lies further from the Kensingston inscription than the Dalecarlian.

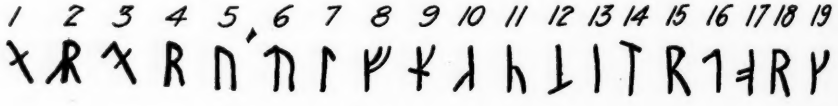
AN UNDECIPHERED INSCRIPTION

As all the material is here convenient I shall in conclusion call the reader's attention for a moment to a hitherto undeciphered Swedish inscription. It has no direct bearing on the present discussion but indirectly throws some light on the true understanding of the American inscription.

Some time ago while studying in the library of the University of Copenhagen my attention was called to an article by Professor Adolph Noreen, the eminent Swedish runologist, on an undeciphered inscription from Dalarne.[31] Professor Noreen characterizes it as "an inscription which although it was the earliest discovered and earliest published inscription from Dalarne, yet remains undeciphered. . . . And one can surely not wonder therat as almost every rune presents its particular difficulties." Professor Noreen adds that this inscription "for many years has been a vexing puzzle" to him and calls upon other runologists to come to the rescue. Then follows his discussion of it concluding with his opinion that the 3 last characters probably represent *o*, *r*, *k*.

The inscription is a very short one, consisting of 19 characters and looks like this:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19



It was carved into an old dead pine near a place called *Draggäröset*.

I sat in the library and looked at this inscription for a little while and it seemed to me I could see light in more than the 3 last characters. Professor Noreen was surely right in his somewhat timid conclusion that the 3 last characters represent *o*, *r*, *k*. The *o* is unusual but agrees with the *o* in the XVII century runestaff shown in column 10 of the preceding table. But the other characters, too, seemed intelligible. Some of them are somewhat mystifying, being inverted, fragmentary or being two on one staff,

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[29] For confirmation of this fact see any of the Dalecarlian inscriptions discussed in *Fornvännen*, 1906, Stockholm, pp. 63–91. The *h* is given as a separate rune in 2 or 3 of the Dalecarlian alphabets because of its recognized ancient place in the *futhork* but as h (*haa*) in Dalarne was pronounced *aa* it soon went over to indicate the vowel *aa*. See the table on p. 268.

[30] See Noreen's *Ordlista Ofver Dalmaalet*.

[31] See *Fornvännen*, 1906, Stockholm, pp. 90, 91.

but such freaks are all common in other inscriptions. I therefore wrote out my inscription which I made out as follows:

aer jak rutulf gert it futhork

that is, *Have I Rudolph made an alphabet.*

A few explanations will make this reading clear: Rune 2 is made up of an *e* and an *r* on the same staff; 3 consists of a *j* (see the *j* in column 12 of table) and an *a* on the same staff; 4 is a combination of a *k* and an *r* on the same staff. In 6 we see a union of a *t* and a *u*, and in 9 we recognize a rather infrequent *g* (see columns 2, 3 and 14). Number 11 is an *r* with the upper loop missing, probably not being noticed by the person who copied it from the rough surface of the pine stump. 12 is an inverted *t* being one of 3 different forms of *t's* in the inscription, all being well-known from other inscriptions (see table). 15 is the most difficult character but can only mean *f* and *u*. In that case the lower of the oblique arms of the runic *f* has been turned downward and a *u* has been formed on the same staff. The character would then look like this— ᚠ —and probably did so on the stump but was misunderstood by the transcriber. The inscription undoubtedly dates from the latter part of the XVI century.

As it seemed strange that a representative of the despised American scholarship should be able at first sight to read an inscription which has baffled the runologists of Europe for years, I showed my reading to several eminent Swedish runologists. They were all kind enough to admit that the puzzle had been solved.

HJALMAR R. HOLAND.

Ephraim, Wis.

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INSTITUTE OF HUMAN PALEONTOLOGY AT PARIS.—A notable addition to the facilities offered by Paris as a center of anthropological research is the Institute of Human Paleontology recently founded by the Prince of Monaco. In the new Institute the Abbé H. Breuil, formerly of the University of Fribourg, occupies the chair of prehistoric ethnography, and Dr. H. Obermaier, former colleague of Professor Hoernes at Vienna, that of geology in its relation to prehistory. Professor M. Boule of the Museum of Natural History, Jardin des Plantes, is the director.

CONGRESS OF AMERICANISTS.—The Eighteenth International Congress of Americanists will be held in London May 27, to June 1, 1912. The main topics for discussion will be; 1. The aboriginal races of America; their origin, distribution, history, physical characteristics, languages, customs and religions. 2. The monuments and the archæology of America. 3. The history of the discovery and occupation of the New World.

For further information application may be made to the Secretary, F. C. A. Sarg, Esq., Royal Anthropological Institute, 50 Great Russell St., London, W. C.

CHIPPED POINTS FROM THE YELLOW SOIL. ALL ARGILLITE. ALL FROM LALOR FIELD TRENCHES

GLACIAL MAN AT TRENTON, NEW JERSEY[1]

FOR more than 30 years the delta terrace of gravel at Trenton, New Jersey, has furnished the classical field for determining the existence of glacial man in America. This delta terrace, now largely built over by the city, covers an area of 2 or 3 miles in diameter at the head of tidewater in Delaware Bay. The Delaware River which here empties into the head of the bay flows for its entire distance with a rather steep gradient, through a rocky gorge 200 or 300 ft. deep, and a few hundred yards in width which it had eroded during the long ages of preglacial times. But during the Glacial period the continental ice-sheet, advancing from the north, covered the upper part of the valley to a great depth, extending as far south at one time as Easton, at the mouth of the Lehigh River. But after a somewhat rapid retreat the front rested for a long period 15 or 20 miles farther up at Belvidere, where according to Lewis and Wright a well defined terminal moraine crosses the valley.

The connection of the delta terrace at Trenton with this ice invasion is easily proved beyond all possibility of reasonable doubt. The surface of the terrace is at present 50 ft. above tide. Innumerable sections show that it is composed of beds of coarse gravel and pebbles frequently containing bowlders several feet in diameter, which could have been brought in only by floating ice. Moreover the material of the bowlders and gravel is all such as is derived from the rocks in the upper Delaware Valley and could come into the present position only by being brought down through the present channel. On following up the river, gravel terraces of similar material appear all the way along its sides. In the melting of the great ice-sheet, which covered four or five thousand square miles of the drainage basin, we have the cause, and so far as we can see, the only adequate cause for the transportation and deposition of the Trenton gravels with all the accompanying phenomena. And in fact no geologist disputes the glacial origin of this Trenton delta terrace. It corresponds closely to what I have observed in every south flowing stream coming out of the glaciated area between the Atlantic Ocean and the Mississippi River. For an enumeration of the localities see page 326 of the 5th edition of my *Ice Age in North America*.

The question is, have remains of man been found in the undisturbed strata of this gravel deposit at Trenton? Over this question of fact an acrimonious controversy has raged for more than a quarter of a century. And even now several of the reviewers of my *Ice Age in North America* express doubt as to the sufficiency of the evidence that man was in North America during glacial times. It is of the first importance, therefore, that we canvass thoroughly the evidence of fact here in question. Have remains of man been found in these gravel strata of Trenton, in such situ-

[1] *The Archæology of the Delaware Valley.* By Ernest Volk. Vol. V of the Papers of the Peabody museum of American archæology and ethnology, Harvard University. 2 maps 125 plates, 26 illus. in the text. Pp. xvi, 258. Cambridge, Mass. Published by the Museum. 1911.

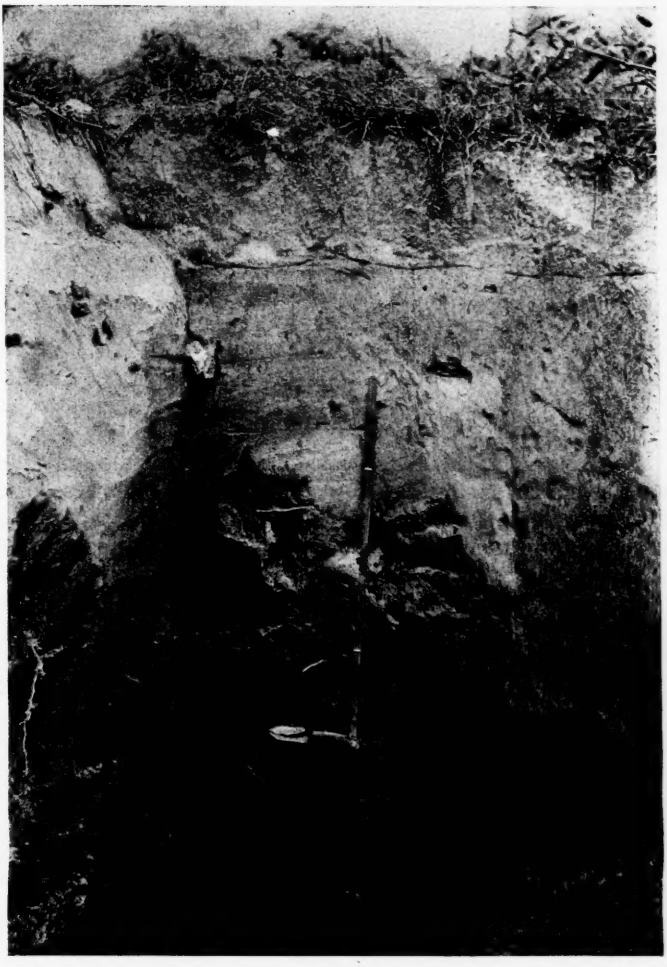
ation that they must be coeval with the deposit? If so, the existence of glacial man in America is proved. It is a simple matter of evidence.

Limiting ourselves to the most salient points of evidence, we have first and foremost that of Dr. C. C. Abbott, of Trenton, who began the study of these gravels as early as the year 1875, and soon after reported a number of artificially chipped stones which he found in undisturbed strata as many as 12 ft. below the surface. Meanwhile Professor Putnam, at the head of the Peabody Museum, Cambridge, Massachusetts, made him a member of the staff of that Institution and for several years Abbott's discoveries and reports were all sent there so that to see the results of the earlier explorations one must go to Cambridge, where he will find an immense collection of implements, the most of which were found upon the surface, but a goodly number of which were reported as found in the undisturbed gravel of glacial age. Setting aside several hundred implements of a peculiar character found in the talus but which had presumably come from the lower strata of gravel, 60 implements were reported by him in 1888 as having been found in place in undisturbed strata of the gravel, some of which were as much as 22 ft. below the surface. All these discoveries were duly reported in the publications of the Peabody Museum and his entire work was summarized in a volume of several hundred pages entitled *Primitive Industry*.

But in order to make the conclusion doubly sure, Professor Putnam, in 1889, commissioned Mr. Ernest Volk, a most conscientious and competent investigator, to work over the field independently, so that the facts might be established by more than one witness. For 20 years Mr. Volk continued his painstaking and laborious investigations, the results of which have just appeared in volume 5 of the *Papers of the Peabody Museum* and which gives everything that can be desired. The volume consists of a diary kept during the entire time, detailing the individual discoveries and describing the situation in which each was found, while 150 photographic illustrations put the reader in possession of the original facts as fully as they can be preserved. Mr. Volk's explorations may be divided into three classes.

1. *That of the present flood plain of the Delaware, extending from the bluff to the bay.* As these deposits are confessedly post-glacial we need not consider them here except to say that everything disclosed in that field clearly belong to the modern Indian epoch.

2. *Personal excavations in the upper 4 or 5 ft. of the Trenton terrace.* This he denominates the "yellow drift," concerning the origin of which there has been some dispute. This deposit everywhere caps the coarsely stratified Trenton gravel and is itself composed of fine material, with, however, occasional pebbles and bowlders of considerable size which apparently must have been brought in by floating ice. By some geologists the theory is advanced that this superficial blanket of finer material is a wind deposit subsequent to the direct glacial deposition. On the contrary, it is maintained by Mr. Volk and various geologists who have given special attention to the subject (including Professor J. Edmond Woodman, Professor Arthur Hollick, Professor William Libbey, and Professor G. F. Wright) that



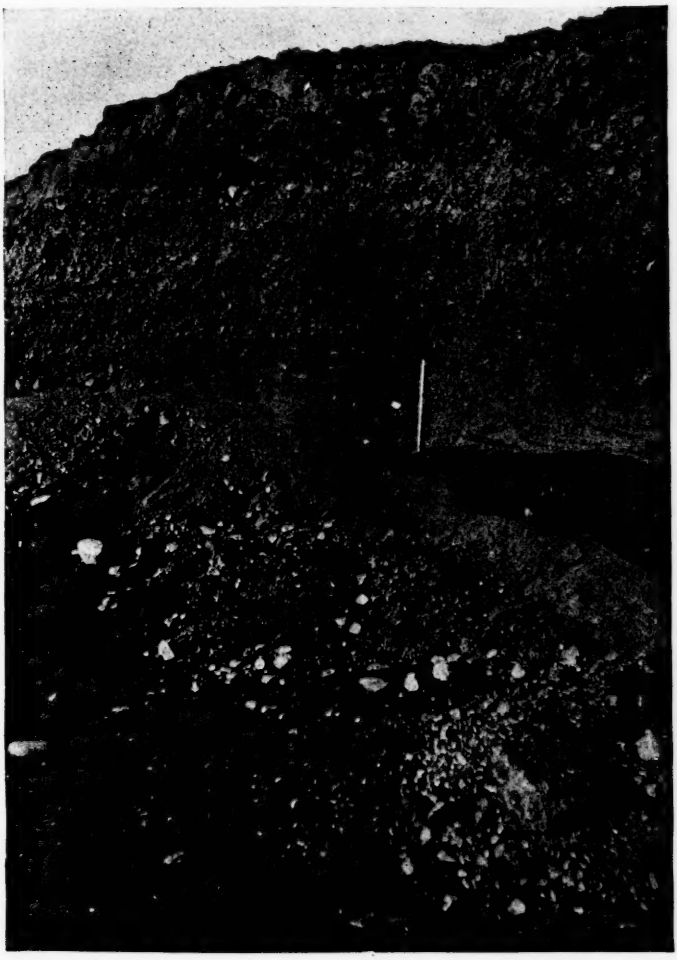
LALOR FIELD. "PROFESSOR HOLLICK'S SPECIMEN," SEPTEMBER 13, 1897

this is a natural deposit of the closing stages of the delta building when, as was inevitable, the water over it became shallower and slower moving and the top of the deposit was about at water level. But as the volume of water was still subject to abrupt fluctuations it would occasionally bring in masses of ice containing bowlders and pebbles to be stranded in the midst of the finer material. One such bowlder was found 100 ft. inland from the bluff and 14 in. down in the undisturbed drift, which was 2 ft. 2 in. long, 2 ft. wide, and 10 in. thick. Another found 2 ft. below the surface in undisturbed yellow drift lying between two strata of clay was $8\frac{1}{2}$ by $7\frac{1}{2}$ by 3 in. in diameter, while numerous others of equal and larger size were found scattered over the surface.

While the stratification of this superficial covering of yellow drift is not always readily apparent to the eye, a series of red bands composed of red clay, iron, sand, and minute water worn pebbles of red shale does appear whenever excavations have been made in it. On analyzing these various bands it was found that the upper ones contained from 27 to 37 per cent of clay, 6 per cent of iron, and the remainder sand and pebbles, while the lower bands showed only 4 per cent of iron and much clay is found in the sand between the bands. This is justly considered by Mr. Volk to be inconsistent with the theory of wind deposits. On June 25 and again September 13, 1897, Professor Arthur Hollick, Professor William Libbey, Mr. Henry C. Mercer, Dr. C. C. Abbott, and Professor G. F. Wright spent several days at Mr. Volk's invitation to witness his explorations. Mr. Volk had already dug over large areas of this yellow drift and as a result of his work was prepared to say to us "choose for yourselves any places you please in the areas of this undisturbed yellow drift and I will guarantee the following results: in the upper 10 in. you will find numerous jasper and flint implements of modern Indian type and some pieces of pottery but below this depth you will not find anything of that sort except possibly in pits showing clearly disturbed material. But below the upper foot of surface material you will find an occasional chipped piece of argillite giving indubitable evidence of human workmanship. The point established by these investigations will be that in the earlier or glacial stage of occupation this field was occupied by a race who had not discovered the quarries of flint and jasper to which the modern Indian resorted, nor had they learned to make pottery but were limited for their weapons and implements to the coarser argillite which crops out in large masses 20 or 30 miles up the river and is found in numerous bowlders brought down by the glacial torrents." (In passing we should say that argillite is a clay or slate deposit which has been metamorphosed by the heat of the trap dykes which intersect it at various places higher up in the Delaware Valley. This breaks with conchoidal fracture somewhat as flint and quartzite do, but is capable of being worked only into very rude implements.)

This guarantee or "prophecy" of Mr. Volk, was amply fulfilled. Numerous Indian remains were found everywhere in the black soil on the surface while at various depths from 10 to 32 in. below the black soil argillite flakes and implements were found between the red bands of the yellow drift. One artificially chipped specimen of chert was also found. A full report of these investigations is printed in the *Proceedings of the American Association for the Advancement of Science*, 46th Meeting held at Detroit, August, 1897, pp. 344–390.

The theories adduced to account for the occurrence of these argillite implements in the yellow drift otherwise than through the closing floods of the glacial inundations, when the delta had been built up nearly to its limit, are very easily made to appear inadequate. The soil is not one which opens in cracks as clay deposits do, so that they could not have slipped down in them, while if as some supposed the implements had worked down through openings made by the decay of the tap roots of trees there is no reason why the flint and jasper should not have followed the example of



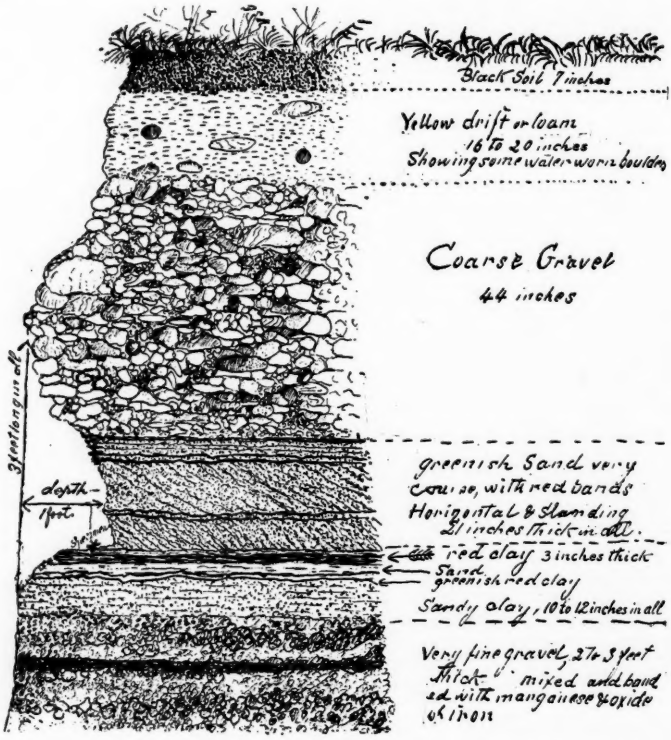
"RAILROAD CUT." WHITE PAPER MARKS THE SPOT WHERE THE CHIPPED PEBBLE WAS FOUND, DECEMBER 9, 1899

the argillite, since their specific gravity is greater than that of argillite. On the other hand this "yellow drift" is precisely like that which accumulates over the flood plain of every large stream and is too uniformly distributed to have been brought in by wind, since there is nowhere over the area anything like dune accumulations.

At any rate these investigations amply sustained the early contention of Dr. C. C. Abbott that there was a sharp line of demarcation between the earlier occupation of the Delaware Valley when argillite only was used for implements and its occupation by Indian tribes who had discovered flint and jasper and made use of pottery.

3. *The traces of man and animals in the stratified gravel and sand older than the yellow drift.* Meanwhile Mr. Volk had continued to visit the openings which were from time to time made in the coarsely stratified glacial gravel that constitutes the main mass of the Trenton terrace, and concerning whose glacial origin there is no dispute.

Passing over all the discoveries of lesser importance, it is profitable to concentrate attention upon the occurrence of a human femur which was found in place in an unquestioned deposit of glacial gravel on the 1st of December, 1899. Of this Mr. Volk has given a very minute description. The bank



CROSS SECTION FACING EAST. RAILROAD CUT SOUTH OF HANCOCK AVENUE
* SHOWS POSITION OF HUMAN FEMUR, DECEMBER 1, 1899

in which the specimen was found was one which had been freshly exposed in a railroad cut where 44 in. of coarse gravel, with pebbles averaging from 4 to 6 in. in diameter (while one was 15 x 9 x 4 in.), overlay a stratum of sand 2 ft. in depth, which in turn rested on coarse gravel. This stratum of sand in which the bone was found was 7 ft. 7 in. below the present surface, but, as the surface was here in a depression 10 ft. or more below the general level of the terrace, the stratum in which the implement was found is really that which is 20 ft. below the general surface, as I have been accustomed to state. On page 521 of the first edition of my *Ice Age in*

North America will be found a photograph of the face of this gravel pit as it appeared 10 years before. When the specimen was found, excavations had carried the face back more than 100 ft. On page 41 of the RECORDS OF THE PAST, January, 1911, is a photograph of the pit as it appeared 10 years later.

In saying that this bone was found by Mr. Volk in place it is necessary to qualify this statement by giving his exact words:

December 1, 1899. Went to the railroad cut this morning, stopping in the sand pits on Hancock Street. The sun, striking the railroad fully, had melted the early frost, which had been sufficient to make about one-eighth inch ice on the water. The bank was active, that is, the sand was continuously running down. The gravel overlying the stratum of sand did not move, being firmly cemented by oxide of iron and manganese. The stratum of sand underlying the heavy gravel is not cemented but is stratified with thin bands of clay and iron dipping to the east, one-eighth of an inch thick and 2 to 3 in. apart. The sand between these bands is only held in place by moisture. The slight frost during the night, now melted, had loosened the sand and it was leaving its place between the thin red bands as fast as the sun was drying up the moisture. A week or so previous to December 1 there was a heavy rain from the south, which, having run down the bank (not sufficient in force, however, to dislodge the heavy gravel nor the yellow soil above it) but washing a gully deep into the sand underlying the heavy gravel. This gully is 2 ft. up and down and 5 to 8 in. broad, and ends on the heavy stratum of yellowish green clay as firm as a rock. This little washout or as I have called it, gully, was a little over a foot deep in the bank. Now, in this little gully, in a heap of loose sand, probably a coffee-cup full or two, I saw some white object, partly covered by sand, still running down from above and fast covering the white object. The object (a bone as I found it was after picking it up) was one foot inward from the face of the bank, between two little pebbles, one a quartzite (slate color), the other on the right a little darker, of the size of a walnut each. I picked it up, there were two pieces, a large and a smaller one; picked up the larger one first, then the smaller came to view; picked this one up too, the large piece touching the little pebble on the left. Now I took careful measurement and found that this bone was 7 ft. 7 in. below the present surface, in a stratum of sand 2 ft. thick, 1 ft. inward of the present face of the bank, between two little pebbles. The little pebble on the left showed a white mark. I thought that this white mark was from the bone that must have struck this little pebble as the large piece of it was in contact with this very pebble on the left. About 4 in. over or above the bone, in the little gully, was a place about the length of the bone where it evidently had fallen out of. Realizing the importance of the bone, I took careful measurement, after which I rolled a big stone on the bottom of the bank, marking the place also with the trowel cutting into the clay bank below, wrapped the two pieces of bone in my handkerchief so that they would not touch, and started home for the camera. On my return, after focussing the place, I laid the large piece of bone down at the exact spot where I had picked it up (the smaller one was left at home) and photographed it (see Plates LXXXIX, XC, and XCI). While photographing, the sand continuously kept running down along the whole bank. After photographing I again wrapped the bone in my handkerchief. I searched the little pile of sand in which I had found the two pieces and found two small fragments of bone. Nothing more was found. These apparently belong to the others. The bone appears water-worn and sand scratched. I handled them very carefully, as carefully as I could, even carried them wrapped in the handkerchief in my hand, not putting them in my pocket, for fear they would rub against each other At home I laid them into a pasteboard box in cotton and sat down to write to Professor Putnam about my grand find. The bones were not touched any more until I packed them and sent them away to Cambridge.—[From field journal.]

According to the report of Dr. Aleš Hrdlička, this bone is "a part of a shaft of a left, and, so far as can be seen, adult and normal human femur.

. . . . From a purely anatomical standpoint the bone is in no way specially remarkable. The proportions and the structure of the shaft, its thickness and the size of the medullary canal, agree with the same characteristics in average American femora." "The piece of bone is apparently very much altered chemically. Its color and consistence are those of a slightly dirty chalk. . . . . Besides the above characteristics the specimen shows a number of artifacts. The piece has been cut in a regular way inferiorly, and at least partly cut or bevelled superiorly. The upper part of the medullary canal looks as if it had been gouged out." "The determination of the age of the two bones, however, must be based principally on their location with regard to geological formation" (pp. 244–247).

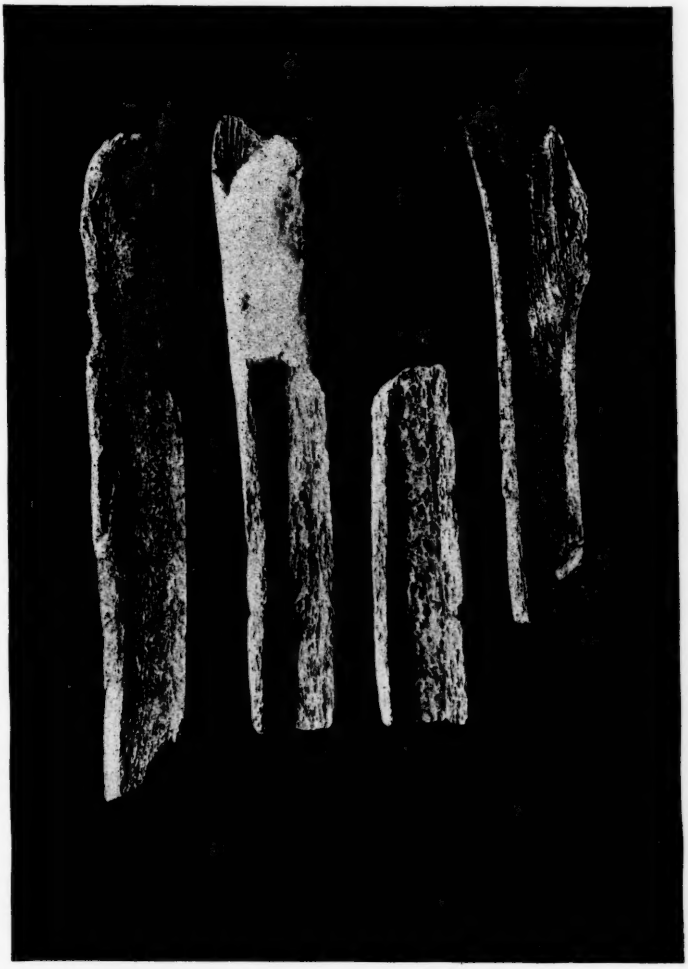
It is not necessary to go farther into the evidence that man was coeval in America with the closing scenes of the Glacial period. This evidence is sufficient to silence all objections and to remove the *a priori* presumptions which have influenced many to discredit the discoveries of Dr. Abbott, Professor Mills, and others. Glacial man in America like his compeer in Europe is a fact with which we must reckon in all our efforts to reconstruct the early history of the human race.

Slight as is the evidence concerning the characteristics of the prehistoric tribe that frequented the head of Delaware Bay in glacial times it is by no means insignificant. The absence of pottery and of implements made from flint and jasper from all the strata of the Trenton gravel below the thin superficial covering of the surface, is very significant. Glacial man had not yet discovered the fine deposits of flint and jasper, some distance up the Delaware Valley, which were quarried extensively by modern Indian tribes and worked into very delicate spear and arrow heads, nor had he invented processes for the manufacture of pottery. For implements he was limited to the use of the coarser and more intractable argillite found 20 or 30 miles above Trenton in the vicinity of the trap dykes that traverse the region, and in bowlders from the same region which were brought down by the floods and scattered over the Trenton terrace. Bones, however, both of animals and men were made use of as implements.

Some have endeavored to belittle this evidence by speaking of the argillite implements found at Trenton as "rejects," such as are found in abundance around Indian workshops. But rejects are of artificial origin and are as good evidence as any of the presence of man. The inferiority of the implements found in the Trenton gravels may be due to the inferiority of the material from which they are made, but they certainly have more resemblance to the so-called palæolithic implements of Europe than they do to the implements of the modern Indian. The geological position in which they are found is, however, of more importance in determining their age than is the type of implement. If we are permitted to speak of the manufacturers of these implements as glacial men we are not specially concerned with the question whether or not his implements shall be classified with the so-called palæolithic implements of Europe. They certainly are rude enough to be palæolithic; while the implement discovered by Mr. Mills in glacial gravels at Newcomerstown, Ohio, made from flint found in the

Mercer limestone is as perfect a replica of the palæoliths found at Amiens, France, as could be desired.

The infrequency with which human and animal remains are found in the Trenton gravels is accounted for by the small ratio which they bear



THE TWO PIECES OF THE TRENTON-FEMUR IN THE CENTER, SHOWING THE INTERNAL STRUCTURE. CORRESPONDING PORTIONS OF FEMUR OF AN INDIAN FOR COMPARISON ON LEFT AND RIGHT

to the entire deposit. Looking for these remains in the gravel is like looking for a needle in a haymow. The chances of finding an implement in place are very slight. But while others, like myself, may have made numerous occasional visits and failed to find specimens in place this should

furnish no reason to question the discoveries of Dr. Abbott whose opportunities for observation were a thousand times greater than ours, and whose eye was trained to detect the slightest indication of human workmanship. Nor is the experience at Trenton very different from that at Amiens in France. I, too, as well as some of my acquaintances skilful in such investigations, have repeatedly visited the gravel pits at Amiens without making any personal discovery. Indeed, as Reinach remarked to one of us scarcely any discoveries have been made at Amiens by trained investigators. So infrequent are the discoveries there that a man of science would need to camp down upon the spot and live a hermit's life for an indefinite period if he would hope to find an implement in place. Almost all of the implements at Amiens have been found by the workmen who are handling the entire output of gravel. It is not to be expected that human remains should be distributed through these immense deposits of rapidly accumulating gravel as frequently as trilobites are in the slowly accumulating beds of Silurian limestone.

Of course the discovery of the remains of glacial man in Trenton gravels does not tell us how long man had been on the continent previous to the closing floods of the period. That is left to conjecture and to inferences drawn from various general considerations. But the evidence reveals to us man in the Delaware Valley living in about the same conditions as those which surround the Esquimaux in Greenland at the present time. Like the Esquimaux he was ignorant of the use of metals and his implements were limited to those made of a poor quality of stone and of bones both of man and animals. Moreover, he was associated by very much the same class of animals as are found in Greenland at the present day, with the addition of the mastodon, whose tusks are found in the Trenton Valley. The walrus, the Greenland reindeer, the caribou, the bison, the moose, the musk-ox, and the mastodon have all of them left their remains either in the superficial gravel deposits of southern New Jersey or on the adjoining country to the south and west.

The picture of human life at that period in the Delaware Valley is substantially the same as that presented by the archæologist of Europe, for southern England, and northern France in the declining years of the Glacial period. Evidently in America as in Europe the Glacial period marks a great cleavage in the progress of prehistoric man. There is much convincing evidence to show that glacial man, both in America and in Europe, shared the fate of the large number of animal species which during that time became extinct, either throughout the world or in the areas occupied by man at the time. In North America the camel, the hippopotamus, the rhinoceros, the tapir, the mammoth, the horse, and the mastodon were abundant at the beginning of the Glacial period. Their complete extermination in connection with it is one of the most startling facts in geology. The sharpness of the transition from the argillite implements in the Trenton gravels to the implements of different material and of modern Indian type found upon the surface, seems to indicate an absolute distinction between the two succeeding races, with an interval of indeterminate length.

GEORGE FREDERICK WRIGHT.

PALESTINE AND ITS TRANSFORMATION[1]

MORE and more geology, geography, and climatology are shedding light upon the early historical periods of Central and Western Asia and of the Mediterranean basin. In all these regions the golden age is in the past. Everywhere there vast empires have crumbled to dust, and high civilizations have given place to civilizations of lower order. This is preëminently the case in Palestine. From about 1200 B. C. to the early part of the Christian era, Palestine supported a population of 2 or 3 million people, producing a history of surpassing interest and a religion and literature that have conquered the world. The treasures of Palestine carried away by Pompey were sufficient to enrich all Italy; while at the present time its population is scarcely more than half a million, and its people are in general poverty stricken and dependent for support in no small degree upon the wealth brought in by pilgrims and tourists.

There are two theories to account for this transformation. First, that the decline is the result of desert conditions produced by a diminution of rainfall. Second, that the decline is due in large measure to bad political and social conditions and the accompanying impoverishment of the natural resources through the short-sighted and wasteful policy of the inhabitants in appropriating the stored up riches of the land.

Mr. Huntington is an ardent advocate of the first theory, and probably is better prepared to present it than any other person who has written upon the subject. For several years he was under commission from the Carnegie Institution to study the geographic and climatic conditions of Central Asia, the results of which were published in a volume entitled *The Pulse of Asia*. In this volume he maintained that for the last several thousand years there has been a gradual desiccation of the climate of Central and Western Asia interrupted, however, by numerous pauses and reversals when for a longer or shorter time the rainfall has for some reason increased, producing a "pulsatory" movement that has given rise to the title of his book. Evidence of such a pulsatory movement in the decline of the rainfall is thought to be found in the abandoned shore lines of numerous lakes in Central and Western Asia, among which may be mentioned Lob Nor, Seyistan, the Caspian Sea, Lake Buldur in Central Asia Minor, Lakes Urumiah and Van in Persia, and the Dead Sea. In all these cases there is clear evidence that the water formerly stood at a much higher level than now, which, since they are enclosed basins, would indicate a greater rainfall in former times.

But it is not so easy to get evidence of a temporary rise in the water of these lakes as it is of its gradual diminution. The higher shore lines in all these lakes carry us back to the Glacial period and connect themselves

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[1] *Palestine and its Transformation*. By Ellsworth Huntington, Assistant Professor of Geography at Yale. 39 illustrations—plates, maps and plans. Pp. xvii, 443. $2.00 net. Houghton Mifflin Co. 1911. Boston and New York.

with the climatic conditions of that prehistoric age. Apparently the lower shore lines are connected with the decline of the Glacial period and its accompanying climatic changes. For example, at the culmination of the Glacial period the water over the Dead Sea reached an elevation of 1400 ft. above its present level, forming a lake 200 miles long and 25 or 30 miles wide with a maximum depth of 2800 ft. At a later well-marked stage this lake had declined till its shore line was only 650 ft. above the present level. Below this there are various shore lines at 210, 170, 145, 115, 90, 70, 55, 40 and 12 ft. Similarly Lake Buldur is surrounded by clearly marked shore lines at elevations of 750, 460, 400, 100 and 35 ft. Between these, especially near the present level, there are numerous minor strands representing more temporary changes of the water level.

The question touching historical problems is: Do these lower shore lines represent changes within the historical period, or are they mainly to be relegated to the time of the climatic changes connected with the closing stages of the Glacial epoch? Mr. Huntington would class many of these later changes as belonging to the historical period. With him would agree authorities no less distinguished than Livingston, Reclus, Fraas, Hull, and Fischer. On the contrary Ankel, Conder, Hilderscheid and Wilson, all of them writers of the highest authority, believe that the present level of the Dead Sea has remained substantially constant from the earliest historical records to the present time. These latter maintain, what is evident, that any marked increase in the rainfall over the Jordan Valley would result in a great increase of the size of the Dead Sea. But this seems incompatible with the facts recorded in connection with the expedition of Chedorlaomer, with the crossing of the Jordan by the Children of Israel opposite Jericho, and the expedition of the Moabitish kings around the southern shore and up onto the Judean highlands from Engedi.

Nevertheless, the evidence adduced by Mr. Huntington showing that there was a greater rainfall in Palestine in the early portion of the historic period than now is very strong and difficult to answer.

The climate of Palestine is determined by the location of the country, which is "normally at the southern edge of the zone of prevailing westerly winds, where rain is supplied more or less abundantly by cyclonic storms of large dimensions moving for thousands of miles from west to east. During the summer, this zone is deflected so far to the north, that its place is taken by the rainless sub-tropical zone of dry descending air, or by a modified form of the trade-wind belt, where the winds blow prevailingly from a northeasterly quarter. In the case of the zone of descending air there is no rainfall, because, as the air comes down, it becomes warmer, and hence relatively drier, so that it absorbs moisture instead of giving it up. In the case of the modified trade-winds, air from the east has blown over the dry interior of Asia, and has had no opportunity to collect moisture. That from the north has had scarcely better opportunities than that from the east; and as it is also moving into warmer regions, where its capacity for holding moisture increases, it, of course, gives up no rain. Thus Palestine has a long dry season from April to October, and a rainy season during the other half of the year. . . . Under the influence of the prevailing

westerly winds of the winter a large portion of Palestine has quite as much precipitation as most parts of England or of the eastern United States. Unfortunately most of it comes in the form of rain and hence runs off faster than if it were snow. The long dry season renders irrigation advisable wherever possible, and indispensable in many places. On the plateaus the porous nature of the limestone, and the small amount of level land prevent irrigation. Hence the inhabitants depend now, as always, upon 'the rain of heaven.' The people store it up in cisterns for the use of themselves and their cattle during the long dry summers, and trust the efficacy of prayer to supply a due amount for the crops in the late fall and early spring" (pp. 256–258).

It would thus appear that a slight shifting of this climatic zone north or south would affect not only the rainfall of Palestine but an extensive area in the same latitude. Mr. Huntington maintains that this cause has affected the rainfall over a very extensive region extending far into Central Asia, where a change of only 2 or 3 degrees F. in the mean average temperature would produce marked changes both in the rainfall and in the evaporation of the region. Moreover the principal disadvantage in the climate of Palestine today arises not from a small amount of rainfall but from the time of year in which it occurs, for the rainfall at Jerusalem averages 26 in. per year, which is about the same as that which occurs in London and is more than that of Berlin or the state of Minnesota. But the most of the precipitation in Palestine occurs during the winter months from November to April and so, if it is permitted to run off, is not available for vegetable growth during the summer months, and only partially available during April and May. It is the former rains, occurring in November, and the latter rains in April and May which are of most importance in Palestine. The first starts vegetation in time for the perfection of the crop and the second furnishes the moisture for its completion. The change in precipitation which Professor Huntington's theory would require is simply a slight lengthening of the season at both ends, and nothing more radical than this is supposed by him to have taken place.

The evidences of a moister climate in early historical times are both historical and monumental. The historical evidence is drawn from statements concerning the former population of the region. Accepting as correct the Hebrew text of Deuteronomy which states that the number of men which came into Palestine able to bear arms was "603,550 besides women and children," this would mean a total of between 2 and 3 millions, a number which was probably equalled in the time of Christ. While in David's time, according to the census taken by him, the population of the kingdom was between 5 and 6 millions. But it should be observed that the best Hebrew scholars regard the Hebrew text of the numbers in Deuteronomy as of doubtful authority, owing to the ease with which units and multiples of 10 may be confused in transcription, while the kingdom of David extended over a much wider area than is covered by modern Palestine.

The monumental evidence consists of extensive ruined cities and villages which are especially abundant in South Palestine and east of the Jor-

dan together with ruined aqueducts and cisterns which would be entirely useless in the present climatic conditions. East of the Jordan also there are numerous remains of Roman bridges, spanning the beds of dry streams where now scarcely any water flows even in wet seasons. Still admitting that Palestine formerly supported a population several times larger than it does at present the question remains whether that might not have been the case under the climatic conditions of the present time. Mr. Huntington maintains that that would be impossible. Those who hold that it would be possible, however, make out a fairly good case by several cogent considerations.

First, attention is called to the extensive means formerly used to store up the water supply for use during the period of the uncertain "latter rains." Numerous abandoned reservoirs abound throughout the country, which might have been sufficient to supply by irrigation the water needed in case of failure of the latter rains. Dr. Marsh calls attention to such in the vicinity of Petra, which even now are partly full of water but have long since been abandoned. The necessity of deep wells in the earliest historical period to supply flocks and their keepers with water during the dry season is apparent from the history of Jacob, who dug the well at Sychar, and from various other episodes in the lives of the patriarchs.

Secondly, the present barrenness of Palestine can be accounted for by the loss of the surface soil through the neglect of the terraces by which it was formerly held in place. Any traveller in Palestine can see the remnants of terraces which formerly made hillsides fertile which are now perfectly barren, the soil having been long since washed away and carried down to sea-level. In Palestine the process has been completed which is going on in our own country and is so alarming to the advocates of the conservation of our agricultural resources.

Third, the deforestation of the country has diminished its productivity in two ways. It has facilitated the washing off of the soil to which reference has just been made, but still more it has permitted the moisture which fell upon the region to run off rapidly to lower levels. The great service rendered by forests is not, as has sometimes been supposed, by increasing the rainfall, but rather by conserving it. The rootlets of the trees and shrubs hold the soil in place and so prevent the water from running off too rapidly after rains and delays its evaporation. A covering of soil protected by forests is equivalent to a reservoir, and so in Palestine by slightly delaying the droughts of the summer months would render the danger from failure of the latter rains less imminent.

The evidence of the former existence of extensive forests, where now the whole region is barren of trees, is abundant. In Joshua 17:14–18 we read that the children of Ephraim and Manasseh, who were assigned to what is now known as Samaria, complained that their allotment was not large enough. Whereupon Joshua answered "get thee up to the forest, and cut down for thyself there in the land of the Perizzites and the Rephaim." The children of Joseph also said "the hill country is not enough for us." Whereupon Joshua answered in substance cut down the forests and it will be sufficient for you.

Professor Huntington, however, points out that the word translated forest is quite indeterminate and probably refers not to a heavily timbered region but to one which is covered by a scrubby growth of lentisk and dwarf oak. Furthermore, he emphasizes the fact that even these had all disappeared during the early stages of Israel's occupation and so could not directly account for the fertility in the time of David and onward. But it is significant that the soil which had been held in place by these forests was further held in place at the outset by the industry of the people in constructing terraces for the location of vinyards, fig gardens, and grain fields. "Wine presses hewn out of the solid rock, banks of stones built up for threshing floors, primitive cistern, etc.," are still found wherever one ascends a mountain peak in Palestine.

Another striking testimony to the former existence of forests is that of Professor H. C. Butler, an archæologist of Princeton, who reports "in North Syria, that is, north of Damascus, structures of all kinds depended upon wood from the I century to the beginning of the VII, but not thereafter. East of Lebanon every house, large and small, and even stables, employed large beams, as is shown by holes in the walls. Many edifices may have been built largely of wood, but these of course, have entirely disappeared. Only the stone buildings remain, but even in these the architect sees clearly that beams were employed, some of them being 20 in. in diameter. This was true everywhere in North Syria, but especially among the mountains northwest of Palmyra. Today the mountains are devoid of forests" (p. 284).

It is not necessary to more than refer to the cedar, fir, and algum forests of the Lebanon Mountains in the time of Solomon. At the present time only a few small groves of cedar remain and they are protected as sacred places. But in Solomon's time 70,000 lumbermen and 80,000 carpenters were employed in these forests to prepare and transport the timber for the building of the first temple. Professor Huntington endeavors to minimize this evidence from northern Syria by calling attention to the fact that in South Syria no wood was ever employed in building but everything was made of stone, the basalt in the region being readily broken into blocks which could be used for beams or door posts. Still, in South Syria there is the same evidence of a decline in civilization after the VII century of our era that there is in the north. Hence he reasons that the destruction of forests cannot have been the cause. At the same time one cannot but be impressed that "in North Syria, among the limestone hills, the slopes were formerly terraced for orchards or fields. Some of the terraces were from 10 to 25 ft. high. Now they are broken; and most of the soil has been washed away to the lowlands" (p. 286).

In proof of the diminution of rainfall in the southern part of the region east of the Jordan, Professor Huntington points first to numerous stream-beds large and small. Yet in the winter of 1904–05, which he says was the wettest for decades, scarcely a drop of water flowed in most of the channels in the interior of the country. But in the days of the Roman occupation it was deemed necessary to build bridges to span these dry streams. At Burak, 40 miles south of Bosra, a sturdy bridge stretches its arches across

a channel of gravel; while still farther east three Roman bridges span river beds that are now always dry. Again, ruined spring-houses and bathing establishments are found in regions where now no water can be obtained. A bathing establishment was observed 50 miles southeast of Bosra and 30 miles east of the caravan route to Mecca in a place which today is absolutely dry. A well 100 ft. deep and 8 ft. in diameter was without water even in the moist season of 1904–05.

Further evidence of a greater rainfall towards the beginning of the Christian era is drawn from the numerous ruined cities and villages of the region, indicating a population which could not be supported under present conditions. The ancient city of Bosra covered an area 25 times that of the present disconsolate village, indicating a population of 35,000 or 40,000. The ancient hippodrome provided seats for 25,000 and the theater for 9,000. Whereas the present population is only 1500, all of whom get their water from a single spring during most years. The ancient Philadelphia, 50 miles south of Bosra, has been repeopled by a colony of Circassians, which has been specially protected by the government for 25 years. But the water supply is so poor that the colony does not flourish, whereas in ancient times the population was so great that a theater 300 ft. in diameter with 45 rows of seats, and holding 12,000 people was built for their accommodation.

And so throughout the region Professor Huntington found that a strip about 15 miles wide running north and south on the western edge of the plateau east of the Jordan is fairly well watered at all times. Another strip of about equal width has intermittent moist and dry seasons making agriculture precarious. Further eastward a strip of indefinite width is fit only for grazing purposes during portions of the year, and is sometimes almost entirely barren, graduating into the arid desert which stretches onward to the Persian Gulf. Professor Huntington supposes that at various early times within the historic period a moister climate has greatly extended these fertile belts and so made possible the density of population indicated by the ruins throughout the region.

Others, however, would account for the decadence of the population by the unfavorable social and political conditions. There is much truth in the saying of a French writer that the "nomad brings the desert with him." From the earliest times we read of incursions into Palestine by the nomads from the east. In Judges 6:5 we read that the Midianites, the Amalekites, and the Children of the East came as far as Gaza with their cattle and their tents and were "as locusts for multitude." "And they came into the land to destroy it." This reads very much like a description which Professor Huntington quotes from Professor Butler of an incursion of the nomads into the fertile portions of Moab. In 1905 Professor Butler's party experienced an extensive snow storm on the plateau 40 or 50 miles south of Bosra. So deep was the snow that the horses were prevented from grazing, and the cisterns remained full for months during the succeeding season; but in 1909 in the same region no water was found in most places.

"Because of the drought the great tribes from the interior swarmed over the grainfields of Hauran. Not far from where the horses pawed the snow

in 1905, the Princeton party in March, 1909, camped at a place called Koseir el Halabat. In scouring the country roundabout for a chance pool of drinking water for the thirsty horses, Professor Butler's men noticed hundreds of storks and cranes flying toward a certain spot. There they found a pool of clear water, about 200 ft. long, 20 ft. wide, and 3 ft. deep. The next day at about half-past eight in the morning, one of the great desert tribes came streaming in from the southeast. Thousands and thousands of camels passed by. Far as the eye could see they stretched away into the wilderness. Scattered at intervals of 100 or 200 ft. they stalked by, hundreds abreast, bending their sinuous necks and sticking out their tongues to crop a bit of dry bush from ground which looked absolutely barren. For fully 9 hours, till half-past four, the monster procession continued to pass. When the horses of the archæologist were taken to the pool that night, nothing remained except a muddy hollow, trampled by the feet of 10,000 camels. The beasts passed on towards Gilead and Galilee. Passing through southern Hauran, they ate the grainfields to dust, even as they had drunk the pool to slimy mud. The poor villagers shot at the Arabs, and then ran into their villages for shelter, much as the people of old Edrei probably did when they took refuge in their caves and passageways. Soldiers were sent to stop the Arabs, but in vain" (pp. 300–301).

Without protection an agricultural population is completely at the mercy of marauding nomads. The protection given by the strong arm of the Roman power naturally accounts for the spread of civilization to a considerable extent over the area under consideration. Professor Huntington is confident that the water which used to fill the dry streams of the region necessitating the building of bridges cannot now be drawn off by underground channels. But from what we know of the extent of such channels in volcanic and limestone regions elsewhere it is by no means impossible that they may exist throughout that region, thus accounting for the present conditions.

Apparently Professor Huntington assumes that dry seasons are the only causes which induce nomads to migrate and to send out marauding expeditions. But we are not permitted to overlook the effect of the Malthusian law that everywhere population tends to increase faster than the means of subsistence. While the products of the soil remain approximately uniform, population increases in geometrical ratio, and thus brings it to the brink of starvation and forces it to seek sustenance elsewhere. The action of this law is painfully evident in India and China where the population has reached a density which leaves but a slight margin between years of plenty and years of famine. The consequence is that when there is a comparatively slight shortage of crops the people, not having any available remedy in sight, starve to death by the million every 10 or 15 years. Another illustration is to be found in the present condition of the peasants in Russia. Since the abolition of serfdom the population has doubled in numbers so that the land allotments are insufficient to meet their wants; but, fortunately, the broad plains of southern Siberia are open to them, while the means of communication are so improved that millions of the people can easily and peaceably migrate, thus giving relief at home and building up a

new empire in the east. In England at the present time this pressure upon the means of subsistence by the increase of population leads not to a nomad invasion but to a desperate uprising of the people to compel a division of profits resulting from their handiwork.

In other conditions these necessities have led to vast movements of nomad populations such as were witnessed in the time of Tamerlane, whose hordes abandoned the more constricted areas of northern Mongolia and took possession of the larger and richer irrigated fields of western Turkestan.

The strongest objection to the supposition of a greater rainfall than now in Palestine in the early historic period is drawn from the apparent stationary level of the Dead Sea. Since the area of the Dead Sea is regulated by the equilibrium between the precipitation and the evaporation over the Jordan Valley it follows that if the precipitation has at any time been largely increased the evaporating surface of the Dead Sea would also have to be increased, which could be done only by the rising of the surface causing it to overflow the lowlands around its borders. But, so far as we have any definite facts from which to draw inferences, the level of the Dead Sea has not varied to any great extent during the last 3500 years. So far as the evidence goes it would indicate that in the time of Joshua the level of the Dead Sea was 30 or 40 ft. lower than now. Professor Huntington reports (page 325) that in a series of soundings made by him at the northeast corner of the lake, and extending out a little more than a mile, he discerned "at depths of 20 and 30 ft. sudden irregularities in the slope of the bottom suggesting small strands." While "between the depths of 41 and 48 ft. the irregularities are pronounced for a distance of half a mile. The contour of the bottom simulates that of a series of beaches thrown up one after another in such a way as to form lagoons. The same conditions may be seen along the present shore near the mouth of the Jordan." To be sure this single series of soundings is not sufficient to establish beyond question the existence of such a submerged strand all around the lake but it strikingly agrees with the conclusions which I had drawn in a paper before the Society of Biblical Literature, in January last. In this it was shown that the sediment brought into the Dead Sea by the Jordan and the wadies descending to it from the highlands on the sides and at the south end has encroached upon the area of the sea by pushing out deltas from all the shore lines where the streams enter the sea, thus restricting the original evaporating area to the probable extent of perhaps 25 or 30 square miles. This amount of encroachment was made probable by estimating that the amount of sediment brought in by these contributing streams since the time of Abraham would amount to fully 2 cubic miles; while it was made practically certain by a consideration of the actual deltas and "cones of dejection" which surround the lake on all sides. A striking confirmation of this reasoning is found in the description of the boundary line of Judah and Benjamin given in Josh. 15:2, 5 and 18:19, where it is said that the boundary of Judah starts from a "tongue" of the Salt Sea at the south end and runs westward; while the border between Judah and Benjamin comes down to the "north bay" (tongue) of the Salt Sea at the south end of the Jordan at Beth-hoglah, 5 or 6 miles above the present mouth of the Jordan.

As there is now no tongue of water extending up to Beth-hoglah and none at the south end of the sea it is so significant as to amount to scientific proof that these conditions are exactly met by the supposition that the level of the Dead Sea was at that time 40 ft. lower than now, thus accounting for Mr. Huntington's probable buried strands, and at the same time accounting for tongues of water at both ends of the Dead Sea before they had been obliterated by the deltas which filled them up. Moreover, this theory, according so closely with the results deduced from the action of present natural causes, explains the traditional and historical references to the richness of the plains surrounding Sodom and Gomorrah, if as we believe, they were at the south end of the lake, and to the traditions that they are now submerged somewhere in the shallow water which characterizes the southern portion of the lake. If the water stood 40 ft. lower in the time of Abraham than now, the whole plain south of the Lisan would have been dry land with irrigating streams enough to make it like the garden of the Lord. For the water over this area is now no more than 15 ft. deep, and at certain stages during the last century it is known to have been forded by the Arabs. Indeed, a causeway from the Lisan across to the west side has been recently brought to light. All this indicates a rise of 30 or 40 ft. in the level of the lake since the earliest historical records. On Professor Huntington's theory of a diminution in the rainfall, this rise of the water might be accounted for on the supposition that the sedimentation had more than kept pace with the diminution of the water supply so that with a fairly constant rise of the water level the evaporating area has not increased but rather been diminished.

But taking all things into account the weight of evidence seems to be opposed to Professor Huntington's theory. Briefly stated the succession of events is probably as follows. From 10,000 to 20,000 years ago coincident with the greatest expansion of ice in the Glacial period in North America, Europe, the Lebanon Mountains and the mountains of Central Asia, the valley of the Jordan and the Dead Sea was filled with fresh water to a height of 1400 ft. With the decline of the Glacial period, however, 8,000 or 10,000 years ago the accompanying climatic changes were such that the lake in the valley of the Jordan was reduced to nearly its present dimensions, while at the time of the earliest historical records, about 4000 years ago, the surface of the Dead Sea was 40 or 50 ft. lower than now, though at the same time exposing an evaporating surface at that level as great or even greater than that which it now has. Very likely, at that low level, passage along the shore on the west side was possible along the entire shore line, thus facilitating the entrance of emigrants like Lot to the southern end, and military expeditions like that of Chedorlaomer. But after 4,000 years the action of the natural causes now in operation has so encroached upon the original shore line as to diminish the area of evaporation and cause the water to rise and overflow the surrounding lowlands at the south end so as to keep a fairly constant equilibrium between evaporation and precipitation.

Meanwhile, the forests from the hills and mountains were destroyed, the terraces neglected, thus causing erosion to proceed with abnormal

rapidity, and wash the rocky surfaces bare while permitting the rainfall to run off with undue rapidity. At the same time an industrious population protected by a strong central government has doubtless delayed the natural course of events by terracing the hillsides and by building artificial reservoirs to insure themselves against the failure of the latter rains and so kept up the fertility of the soil. But the constant pressure of the nomads from the east, accompanied with the failure of protection from the central government, has finally so disheartened the agriculturalists, that they have suffered their reservoirs to be destroyed, their cisterns to be abandoned, and their terraces to be broken down. Now for a thousand years since the Mohammedan occupation this neglect has been continuous until the country is past complete resurrection. Something may yet be done to restore the former prosperity, but its complete restoration is probably impossible. After all, man can contend with the forces of nature and bend them to his will more successfully than he can stand up against the cupidity, violence, and chicanery of his fellow men.

GEORGE FREDERICK WRIGHT.

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BOOK REVIEWS

THE INTIMATE LIFE OF ALEXANDER HAMILTON[1]

AN extract from the preface will, perhaps, best outline the scope of this work. "The purpose of the writer is to utilize a large number of original letters and documents, written by Alexander Hamilton and various members of his family as well as his contemporaries, and which in some measure throw light upon his private life and career as a soldier, lawyer and statesman. Most of these have never been published, and were left to me by my father, the late Philip Hamilton, who was his youngest son. I have no more ambitious purpose than to produce a simple narrative, for there are several important works that fully and formally describe his public services. . . . . If I have gone into detail very minutely it is because of the belief that the familiar side of his life will be of interest to a great many people who have hitherto been furnished only with unauthentic generalities."

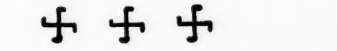
As will be inferred from the foregoing, much space is devoted to the letters themselves. The letters, however, are arranged according to their bearing on certain phases of Hamilton's character and career, rather than in chronological order. Thus we find chapters on *Personal characteristics; As a writer and orator; Elizabeth Hamilton; Family life; Friends and enemies; Building a home*, etc.

Eleven appendices and a full index further enhance the value of the work.

[1] *The intimate Life of Alexander Hamilton*, based chiefly upon original family letters and other documents, many of which have never been published. By Allan McLane Hamilton. 28 illus. Pp. xii, 483. $3.50 net. New York: Charles Scribner's Sons. 1910.

THE INDIAN PLACE-NAMES ON LONG ISLAND[2]

PERSONS living all or part of the year on Long Island will be specially interested in Mr. William Wallace Tooker's book on the *Indian Place-names on Long Island.* However, the book has a wider significance, for incorporated in it is much valuable material gathered from sources now destroyed, notably records of land-papers which were destroyed in the burning of the capitol at Albany. The origin and history of 486 place-names and also their location are given. In an appendix is printed a list of Algonkian names suitable for country homes, hotels, clubs, motor-boats, etc. The preservation of these Indian names is a commendable practice which adds picturesque interest to the places thus named and should be encouraged.



NOTES ON HAWAIIAN PETROGLYPHS[3]

FOR some years Mr. John F. G. Stokes has been collecting data on the Hawaiian petroglyphs, which the Bernice P. Bishop Museum has now published with the intention of later publishing any further data which may come to light.

The first record of petroglyphs on the islands was made by Mathison in 1822, when he saw a pictured stone on Oahu. Since that time several others have observed and recorded them in various parts of the islands.

During 1906 and 1909 Mr. Stokes, while journeying on the islands of Hawaii and Molokai, paid some attention to the petroglyphs and took a number of photographs of them. As many of the lines in the petroglyphs were shallow, it was found necessary to mark them over with chalk to bring out the outlines before photographing. He made it a rule to photograph them as they were, without completing incomplete figures. Mr. Stokes came to the conclusion that the usual tool was a beach pebble, instead of the stone adze, as others have thought. The adze could hardly keep its edge long in such work, and a pebble would do just as well.

Many of the glyphs are on the surface of ancient lava flows near the beach, though there are some on loose stones. Some are under water at high tide. Others are on the walls of caves. By far the greater part are straight line figures representing human beings with arms and legs in various positions, and with circles for heads, though some are headless. The size varies considerably, some being 10 in. long and others 40 in. One headless figure at Kahaluu the natives said was Kamalalawalu, a king of Maui who invaded Hawaii. According to the native story, the king of Hawaii by strategy

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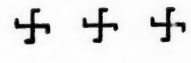
[2] *The Indian Place-names on Long Island and Islands Adjacent.* By William Wallace Tooker, Algonkinist. Edited with an introduction by Alexander F. Chamberlain, Ph.D. Pp. xxviii, 314. $2.50. New York: G. P. Putnam's Sons. 1911.

[3] *Notes on Hawaiian Petroglyphs.*—I. By John F. G. Stokes. Extract Occasional Papers, Vol. IV, No. 4, Bernice P. Bishop Museum, Honolulu. 50 illus. from photographs and drawings. Pp. 39.

drew the invader away from the coast and then killed him in battle. His body was brought to Kahaluu, a picture made in the rock and the body sacrificed.

RECENT PUBLICATIONS OF THE ACADEMY OF PACIFIC COAST HISTORY

Numbers 1, 2, 3 and 4 of volume 2 of the Publications of the Academy of Pacific Coast History were brought out in July and August. They continue along some of the lines begun in volume 1, and are entitled: *The Portola Expedition of 1769-1770, Diary of Vicente Vila,* edited by Robert Selden Rose; *Papers of the San Francisco Committee of Vigilance of 1851,* edited by Porter Garnett; *Expedition to San Francisco Bay in 1770, Diary of Pedro Fages,* edited by Herbert Eugene Bolton; *The Portola Expedition of 1769-1770, Diary of Miguel Costanso,* edited by Frederick J. Teggart.



RECENT PUBLICATIONS OF THE UNIVERSITY OF CALIFORNIA

Some recent publications of the University of California in American Archæology and Ethnology are: *The Material Culture of the Klamath Lake and Modoc Indians of Northeastern California and Southern Oregon,* by S. A. Barrett; *The Chumash and Costanoan Languages; The Languages of the Coast of California North of San Francisco;* and *Phonetic Constituents of the Native Languages of California,* the last three all by A. L. Kroeber.

EDITORIAL NOTES

AN INSCRIPTION FOUND AT LA CAPOCOTTA, ITALY, CONCERNING A JEWISH SYNAGOGUE.—"An inscription has been found at La Capocotta singing the praises of a wealthy Jew, and revealing the fact that a synagogue had been built at Ostia for the use of the Semitic 'villeggianti' on the neighboring coast." *Atheneum*, London, August 26, 1911, p. 250.

HARLAN I. SMITH GOES TO CANADA.—Mr. Harlan I. Smith, who had been connected with the American Museum of Natural History since 1895, has been appointed archæologist of the Canadian Geological Survey. His headquarters will be at the Victoria Memorial Museum, Ottawa, Canada.

MOULDS FOR BRONZE IMPLEMENTS.—In December 1910 there were found 4 miles form Ballymoney, Co., Antrim, Ireland, some stone moulds. The removal of 9 ft. of bog at this point disclosed these relics of early times. The moulds were for the purpose of making bronze spear-heads, daggers, etc. One was unique—a mould for bronze sickles. The opinion has been put forward that these are at least 3000 years old.

ANCIENT BATH AT PALMYRA.—On March 23, 1910, Mr. T. C. Fowle visited a bath discovered the week before at Palmyra—the ancient Tadmor—in the Syrian desert. It is away from the main ruins in the middle of the native town. Some natives had been digging in their courtyard when they accidentally found the bath. It is made of rough stone and is in a good state of preservation. It indicates the presence of a hot water stream, or perhaps lake, under the town.

THE PHILISTINES AND STEEL.—W. Belck, arguing from certain passages in *I Samuel*, *Joshua* and *Judges*, comes to the conclusion that the Philistines were the discoverers of the art of making steel. He thinks they developed the art of iron-working and then of steel manufacture in Crete, during some 8 or 10 centuries prior to their invasion of Canaan in the XIV or XIII century B.C. In their conquest they were aided greatly by their scythe-bearing chariots.

ARCHÆOLOGY BY MEANS OF POST CARDS.—There has been issued under the direction of men connected with the Royal Museums of Brussels a systematic series of 9 dozen postal cards dealing with the section of antiquities in these museums, thus placing within the reach of the people for home use the most important antiquities of these museums. Two dozen are of Egyptian antiquities; two of Greek and Roman marbles; two of Greek vases; one of terra cottas; one of bronzes; and one of Belgo-Roman antiquities.

AGE OF MUMMIES.—Doctor Elliott Smith considers the oldest mummy in the Cairo museum not older than 1580 B.C. Another found by Messrs. Lythgoe and Mace at the Lisht Pyramids he believes is of the XII dynasty, and still another found by Mr. Quibell at Sakkara 4 years ago is of the X and XI dynasty or about 2100 B.C., while a mummy from Medum found by Petrie 12 years ago is of the V dynasty about 2700 B.C.

PAPERS OF THE SCHOOL OF AMERICAN ARCHÆOLOGY.—We are in receipt of the following papers of the School of American Archæology: *The Excavation of the Cannonball Ruins in southwestern Colorado*, by Sylvanus G. Morley; *The Pajaritan Culture, The Excavations at Puye, New Mexico, in 1907, The Excavations at Tyuonyi, New Mexico, in 1908, The Excavations at El Rito de los Frijoles in 1909*, all by Edgar L. Hewett. These are reprints of articles which appeared in the *American Anthropologist, the American Journal of Archæology* and *Out West*, giving accounts of work connected with the School.

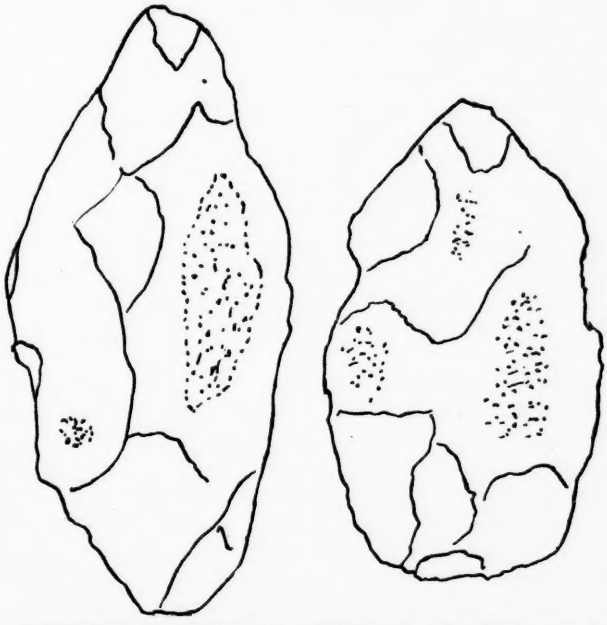
REMAINS OF A ROMAN MANUFACTORY IN WALES.—Mr. T. Arthur Acton has for the past 4 years carried on excavations near Holt, East Denbighshire. Numerous Roman relics were found, enough to indicate a very considerable Roman settlement at Holt. The main buildings, according to Professors Haverfield and Bosanquet, probably constituted a manufactory—a portion of tile and pottery works. The stamp of the potter, Julius Victor, has been found. It is thought that iron nails were also made there. Large pieces of window glass found lead to the supposition that it, too, was manufactured at Holt.

PROFESSOR BINGHAM IN PERU.—Professor Hiram Bingham with the Yale University Scientific expedition arrived at Lima, Peru on June 23 and later went into the interior. He expects to make a cross section from the river Purus to the Pacific along the 73° meridian via the Urubamba valley, Abancay and Mount Coropuna. They plan to reach the Pacific in December. Special attention will be given to any ruins that may be encountered. With Professor Bingham are Professor H. W. Foote, naturalist; Professor Isaiah Bowan, geologist; Doctor W. G. Erving, surgeon; Mr. Kai Hendriksen, topographer; Mr. H. L. Tucker, engineer; and Mr. P. B. Lanius, assistant.

EXCAVATIONS ON CRETE.—According to the *Illustrated London News*, Professor Frederic Halbherr considers the market place which the Italian Archæological Mission in Crete recently uncovered at Haghia Triada the oldest market place ever found on Greek soil. The Minoan palace and Royal Villa at Phaestus and Haghia Triada have been completely excavated. At Lebena on the southern coast of the island the Græco-Roman temple of Aesculapius with its surroundings was entirely unearthed. New researches have been carried on at Gortyna and at Prinia, on the slope of Mount Ida. At Prinia archaic Greek shrines with remarkable pieces of sculpture in primitive style were found.

PROPOSED IMPERIAL BUREAU OF ANTHROPOLOGY IN LONDON.—The Council of the Royal Anthropological Institute of Great Britain and Ireland sent to the recent Imperial Conference in London a Memorial urging the establishment of an Imperial Bureau of Anthropology. The proposal is that the Bureau should be established in London and that it should be managed by a committee composed of the Council of the Royal Anthropological Institute and representatives of the Governments of the British Dominions, of the Indian and Colonial Offices, and of those universities in Great Britain, in India and the Colonies and Dependencies of the Empire where anthropology is systematically studied.

ANOTHER IMPLEMENT FROM THE YELLOW DRIFT AT TRENTON.—Dr. C. C. Abbott reports the recent finding of the implements of which we give illustrations, in the "yellow drift" near his house in Trenton, N. J. They were brought to light in a fresh cut 3 ft. below the surface in undisturbed strata. The implements are of argillite and of palæolithic type and are partially covered with a thick accretion of iron, shown



ARGILLITE IMPLEMENTS RECENTLY FOUND IN TRENTON BY DR. ABBOTT

by the dotted areas in the illustrations. None of the flint and jasper implements found near the surface have such accretions, but pebbles of flint and jasper lower down in the deposit do have them. All this is in line with Dr. Abbott's earlier discoveries, and with those of Mr. Volk, whose report is reviewed on a previous page. Such cumulative testimony should dispel all doubts about glacial man in America.

ANCIENT MINES IN SPAIN.—The reopening of the Oural and Aram copper-cobalt mines in Spain gives us a glimpse into the methods of prehistoric mining. According to reports, the galleries and drafts do not open directly into the mountain side, but are entered by means of several vertical shafts a few meters in height. Numerous relics were found, both inside and out. Two complete skeletons were discovered as well as a number of incomplete ones. Implements of stone and bone and even a few coins were picked up. Someof the stone hammers were intended to be used without handles, and sometimes weighed as much as 20 pounds, indicating extraordinary muscular development on the part of the miners. Some of the men were tall. Many of the diggings worked are so narrow that only slim men could possibly have done the work. The relics of lighting appliances are interesting. Numerous pieces of wood with one end charred were found sticking in lumps of dry clay plastered on the walls of the galleries.

PETROGLYPH FROM EASTERN MASSACHUSETTS.—Some months ago Professor Harris Hawthorne Wilder of Smith College came into possession of a stone covered with inscriptions. It is a small oblong boulder of trap about 10 in. long. The surface has weathered to a rusty red color. It was found 60 years ago in West Wrentham, in the edge of Norfolk County by a Mr. Simeon Stedman, who carried it to his home in Cumberland, Rhode Island. There it remained for 30 years, when it was used to mend a back door step, in which capacity it was serving when rescued by Professor Wilder. One edge was constantly exposed to wear till it was nearly smooth, but nevertheless it still shows some traces of an inscription. The inscription runs around the entire stone, leaving the two ends only uninscribed. Professor Holmes of the United States National Museum has made a tracing of the inscription. The more usual human and animal figures are absent. In some respects it bears striking resemblance to the petroglyph on Bald Friar Rock in Maryland, and to certain parts of the Dighton inscription.

As to the purpose of the inscription, not much can be said. It is too small to have been a boundary stone, too hard to work to have been a simple message from one party to another; it has been suggested that it served some ceremonial purpose.

Professor Wilder feels that it is genuine—the people involved at present would be incapable of conscious fraud, and fraud would not be likely 60 years ago among New England farmers who were not particularly interested in such relics.

DEATH OF T. S. DENISON.—On April 7, 1911, occurred the death of Thomas S. Denison, whose pamphlets of *Nauatl or Mexican in Aryan Phonology*, *The Primitive Aryans of America* and *Morphology of the Mexican Verb* were reviewed in the March-April issue of RECORDS OF THE PAST, and whose paper on *Aryan Origin of the Aztecs* appeared in the July-August issue. Mr. Denison was born in Marshall County, West Virginia, in 1848. He was educated at Normal University, Lebanon, Ohio.

His was a varied career. After teaching school for a time, he tried his luck as a prospector and trudged through the Rocky Mountains in

search of gold. Later, in 1878, he entered the publishing business in Chicago, and continued in that business up to the time of his death.

He was author of several novels, some verse and 30 plays for amateurs. But his most noteworthy work was along philological lines. Some 10 years ago he began a systematic study of the Nauatl or ancient Mexican language. He finally became convinced that the Mexican and primitive Aryan tongues were cognate and that the Mexicans were of Aryan stock. Aside from the linguistic similarities, he noted certain religious and social customs in which the civilization of the Aztecs resembled that of ancient eastern countries such as human sacrifice, worship of fire, self-torture and penances, festivals, marriage customs, etc.

Mr. Denison's death is much to be regretted for he was doing faithful original work along lines which few are prepared to take up.

DOCTOR MACKENZIE'S WORK AT 'AIN SHEMS.—Doctor Mackenzie, owing to delay in procuring the permit and to the exceptionally severe winter, was unable to begin work at 'Ain Shems until April 6 of this year. This spot is commonly supposed to be the site of the Beth-Shemesh of the Bible. The Tell of 'Ain Shems consists of two hills with a depression between. In the depression is a Wely, or old Mohammedan shrine, dedicated to a holy man, Sheikh Abu Meizar. As this shrine has been abandoned by the Mohammedans, Doctor Mackenzie was allowed to make the Wely into his general office and museum. Yusuf Kanaan, who has formerly acted as foreman for the Palestine Exploration Fund in its excavations, was again employed.

During the next few weeks considerable was accomplished. In speaking before the annual meeting of the Fund, Sir Charles Watson, who visited the site during May, thus summed up the work done:

> The old wall of the town has been traced all round the hill, and parts have been laid bare to the foundation and show that there have been several periods of construction, the earliest dating very far back. A very interesting discovery has been the south gate of the town, well defended with towers and guard chambers. Possibly this was the only gate, but it is too soon to say with certainty as the whole of the north wall has not yet been excavated. There are signs at the gate, and in other places, that at some time there was an extensive conflagration which seems to have destroyed the town. Even the ground shows signs of the fire. At the southeast corner of the wall are some ruins of Byzantine date, and as these occupy the highest part of the hill it is probable there are important older constructions below them, but it will take some time to get down to these. Outside the wall of the city on the east side of the Tell, Doctor Mackenzie has come across a very interesting cave used for burial and containing objects of an early date. The roof has partially fallen in, perhaps from the result of an earthquake, and some blasting will be required before it can be fully investigated.
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> Great quantities of pottery of all ages have been found, but these are not yet classified. Some pieces are apparently from Cyprus or the Greek Islands. Flint implements, bronze and iron objects have been found, while other articles belong to an Egyptian occupation of the city—possibly of the XVIII dynasty. But it is too early yet to speculate as to the history of the city.

Some troglodyte dwellings were also found, but have not yet been thoroughly investigated. Doctor Mackenzie thinks some of the accumulations of deposit point to troglodyte habitation going back possibly to the border of the Neolithic age and the III millennium B. C.

DISCOVERY OF AN ANCIENT CANOE AT AUSTRUWEEL, BELGIUM.—On October 10, 1910, Engineer in Chief Zanen informed the authorities of the Royal Museum at Brussels of the discovery of an ancient canoe in the course of the work of extending the harbor of Antwerp. The Museum immediately sent to examine the locality. The boat was found at a depth of about 18 ft. in sand under modern soil, resting upon the bed of an ancient river whose width reached 197 ft.

It was out of the question to transport it to the Museum in one piece because of its fragility and weight, hence it was decided to saw it into a number of pieces. In that way all the sections were transported in good condition to the storehouse of the Museum. These portions were subsequently cleared of the mud which enveloped them, and carefully studied. Thus a plan of the whole and a series of sections could be made before the wood dried and warped.

The width, calculated from the curve of the incomplete portions found, is between 3 ft. 3 in. at the bow and 5 ft. 6 in. at the stern. The thickness of the walls varies from 4 in. in the bow to 6 in. in the stern. The bow, as well as the stern, is cut perpendicularly to the axis of the main portion of the boat; the two ends of the canoe were fastened to the middle by pieces of wood fixed to the body of the craft by wooden spikes. Up to the present no one has found a single piece of these fastenings of the stern and the bow, which are indicated by a series of spikes which are still stuck in the two extremities of the canoe. Moreover, the stern was bound into a groove-shaped cut in the lower part of the bark for the purpose of holding more solidly that part of the boat, which was much larger than the bow. The bow was reinforced by a piece of wood fastened to the middle by thick spikes.

Twelve rows of wooden spikes, separated from each other 3 or $3\frac{1}{2}$ in. and set perpendicularly to the long axis of the canoe, cross the sides of the boat. Their use has not been determined.

In the stern, 4 kinds of iron hooks were found embedded in the sides. These hooks, as well as indications that metal instruments were used in making the canoe, place the date within the iron age. As there were no chance objects, such as pottery, in the vicinity, it is impossible to place the date more definitely than by the geologic beds. The boat rested on the bottom of the stream—a stratum of modified corniferous pliocene sand. It was surrounded by peaty alluvium. This stratum, according to M. A. Rutot, was in process of deposition during the age of polished stone implements and until the end of the Roman period in this region, about 300 A. D. It seems probable that the boat when found was not in its original position, but had, as time went on, sunk through the soft mud till it reached the more solid sand stratum. Hence a bark of pre-Roman times but of the iron age could very well be found in such a situation. Most of the ancient boats found in Belgium have been found at the base of the contemporary deposits.

[Translated and condensed from the French of M. E. Rahir in the *Bulletin des Musées Royaux des Arts Décoratifs et Industriels* by H. M. W.]